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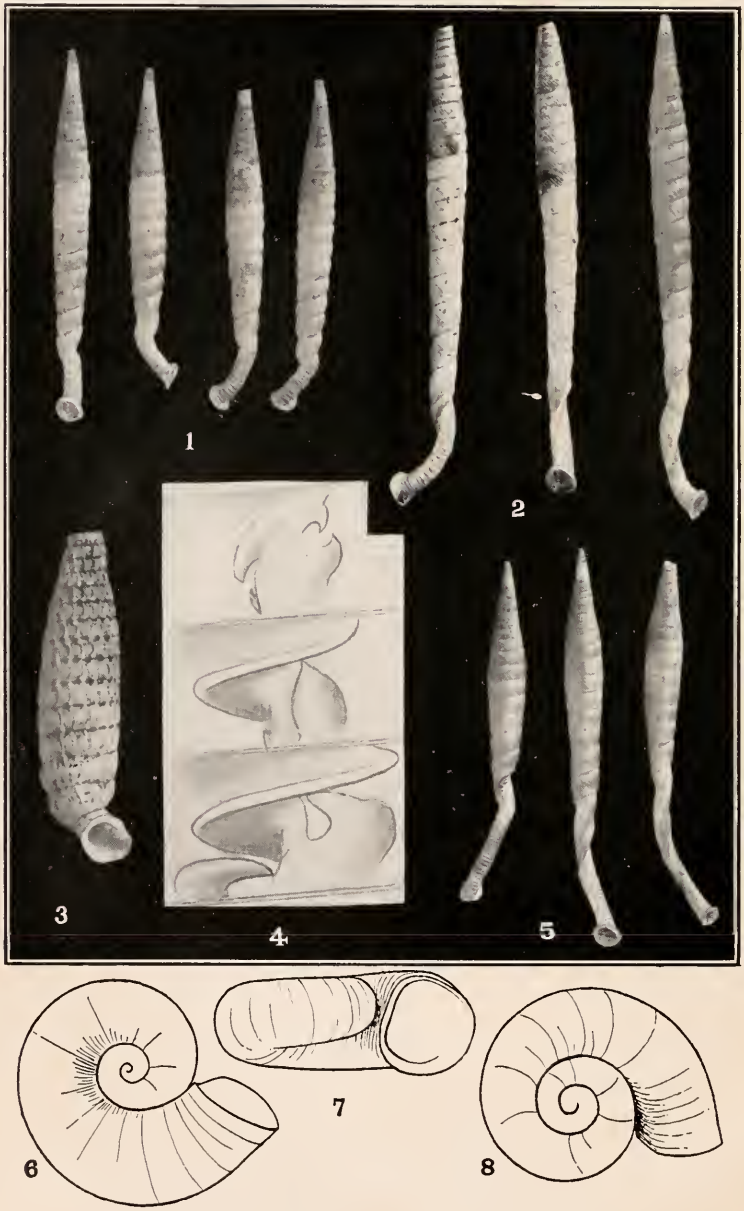

1. BRACHYPODELLA TORREANA. 2. B. RAMSDENI.
3, 4. UROCOPTIS PILSBRYANA. 5. B. BOOKSIANA.
6, 7, 8. CERATODISCUS RAMSDENI.

The Nautilus.

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NOTES ON WEST AMERICAN OYSTERS.

BY WILLIAM H. DALL.

On endeavoring to review the oysters of the Pacific Coast some notes were made which seemed likely to be of use to students.

Ostrea iridescens Gray, 1854; Cpr. Maz. Cat., 1856.

The brief diagnosis of the earlier name is not sufficient to identify this with *O. prismatica* Gray, 1825. *O. spathulata* Sowerby, 1871, is based on a worn upper valve of *O. iridescens*. The species is known to range throughout the Gulf of California and to Mazatlan. I have not compared the African species listed by Carpenter under the same name.

O. megodon Hanley, 1845. (*O. gallus* Val., 1846, and *O. taylori* Gabb, 1866).

From the Gulf of California to Peru. Fossil in the West Indies.

O. fisheri Dall, n. nom. (*O. jacobæa* Rochebrune, Bull. Mus., Paris, 1895, not of Linné, 1758).

Rude, dark purple, sharply plicated, with an inner purple margin, valves subequal, and interior opaque white. Named in honor of W. J. Fisher who made large collections in the Gulf of California and Alaska. This species grows large and heavy, and is only known from the Gulf of California.

O. veatchii Gabb, 1866.

Large, rather roundly plicated, internally with olive, brown stains

and white margin. Lower California and the Gulf. Fossil at San Diego and Cerros Island.

O. CUMINGIANA Dunker, Abbild. II, 1847. (*O. amara* Cpr., 1857; *O. angelica* Rochebrune, 1895. A variety, *O. mexicana* Sowerby, 1871).

The typical form has olive greenish interior, the margin with many small plications, the exterior white. The variety is deeply cup-shaped with blackish interior margin. The species ranges from Lower California to Panama.

O. PALMULA Carpenter, 1857 (*O. lucasiana* Rochebrune, 1895). Puget Sound to La Paz, Mexico.

Margin bounded inwardly by a line of minute pustules, interior dark or greenish. This might well be an extreme mutation of the preceding species but needs connecting links and has a more northern distribution.

O. SERRA Dall, n. sp.? Lower California to Panama.

Like the West-Indian species which grows on gorgonians, narrow, plicate, with flattish upper valve, deep lower valve, greenish outside, inside white with black margin; shell two to three inches long, about an inch wide. If *mexicana* occupied a similar situs the result would be somewhat similar.

O. COLUMBIENSIS Hanley, 1845. (*O. ochracea* and *tulipa* of Sowerby, 1871, not *O. tulipa* Lamarck; *O. turturina* of Rochebrune, 1895). On mangroves. Lower California to Peru. Large, thin, purplish.

O. LURIDA Carpenter, 1864. Sitka to Cape St. Lucas.

O. rufoides is the thin, long variety grown in a current. *O. expansa* the form adhering to a flat surface; sometimes reaching the shape called by Carpenter *laticaudatus*.

O. ELONGATA Solander, 1786. (*O. virginica* Gmelin, 1792; *O. rostrata* and *floridensis* Sowerby, 1871; *O. virginiana*, *canadensis* and *boreadis* Lamarck, 1819.)

Transplanted from the middle Atlantic coast it has failed to reproduce its kind, as the water is too cold for the spat to live in.

O. CONCHAPHILA Carpenter, 1856. Mazatlan to Panama. This prettily painted form seems likely to retain specific rank.

O. CHILENSIS Philippi. Gulf of California to Chile.

This is the large edible Gulf species, referred by Carpenter to *O. virginica*, which it much resembles except in wanting the purple muscular impression. It has numerous synonyms. *O. retusa* Reeve, of the Hawaian Pliocene is also very similar.

O. CHILOENSIS Sowerby, from southern Chile, is small, round, and feebly plicate, but may be a degenerate variety of *O. chilensis*.

O. MULTISTRIATA Hanley, 1846. Gulf of California to Panama.

Usually small and flat with brown and purple blotches on the white inner surface. Easily identified by the sharp radial striæ of the outer surface which is usually a purple tint.

OSTREA TUBULIFERA Dall, n. sp.

The specimen serving as type for this species was collected in the Gulf of California by Henry Edwards; it is suborbicular, about 45 mm. in diameter, nearly flat, with a whitish nacre, brilliantly polished inside, purple clouds showing through, and with a translucent irregularly crenulated margin. The ligamentary area is narrow and very inconspicuous; on each side of it the margin is pustulate for a short distance; the outer surface is mostly dark purple, dull, minutely corrugated and densely covered with small erect tubules of a dark reddish-brown color, 2 to 4 mm. high and from $\frac{2}{3}$ to 1 mm. in diameter. Only those at the extreme margin communicate with the interior of the valves, and these are fissured on the distal side. Those of the surface behind the margin are completely tubular. The attached valve was not obtained. Several beachworn specimens from Panama have lost their tubules and exhibit only a vermicularly corrugated surface. The attached valve is very flat and irregular with a very wide but very short area. These specimens are of a faded purple, but are probably the same species as the valve from the Gulf of California. The only species at all approaching this in character is the *O. spinosa* Quoy, which comes from a widely different region, and has a very prominent, direct and produced ligamentary area.

NEW CUBAN SPECIES OF UROCOPTIDÆ.

BY CHARLES T. RAMSDEN.

UROCOPTIS (IDIOSTEMMA) PILSBRYANA n. sp. Pl. I, figs. 3, 4.

The shell is white, truncate, retaining 14 or 15 whorls in the adult stage, the truncation closed by a very convex plug; upper third tapering, the remainder cylindrical. Whorls flat, the last two or three convex; base with a very weak revolving cord or none. The surface is dull, with sculpture of low axial ribs, which are narrow and weak in the middle of each whorl, enlarged at both ends, which abut against ribs above and below, the ribs being, as it were, continuous from whorl to whorl. In the upper part of the shell, some of the ribs are hollow, as in *U. uncata*. Where unworn, the surface between ribs is finely, sharply striate axially. The last whorl is shortly free in front, and near the aperture it is dilated peripherally and flattened above and below. The aperture is small, shortly fusiform, the narrower part peripheral in position. The peristome is expanded at the outer part, elsewhere reflected. Internal axis is simple and slender in the first three whorls, then a spiral lamella bearing a few projections arises, soon followed by corresponding hooks from below, forming a stage of about two whorls where there are pairs of converging hooks. This is followed by a stage in which there is a broad, smooth superior lamella, and strong hooks arising from the basal partition at intervals of about half a whorl (fig. 4). Finally, in the last two whorls the hooks disappear and the spiral lamella becomes low and finally disappears.

Length 15.5, greatest diameter 3.8 mm.

Length 16.5, greatest diameter 3.6 mm.

Locality, "La Hembrita," Monte Toro, Guantanamo.

This remarkable species closely resembles *U. uncata* externally, but differs widely from that, and from all other known species, by having a smooth spiral lamella in the whorls of the cylindrical part of the shell. The peculiar axial armature of *U. uncata* and other species of the subgenus *Idiostemma* has been figured by Pilsbry in his monograph of *Urocoptidæ*.

BRACHYPODELLA (GYRAXIS) TORREANA, n. sp. Pl. I, fig. 1.

The shell is extremely slender, retaining the apex perfect (two

left figures) or losing very few whorls (two right figs.) in the adult stage; widest at the upper third; white. Whorls 25–26, rather strongly convex, the first four smooth, the rest regularly and closely striate, the striae nearly straight, strongly oblique, about as wide as the intervals. Last half whorl free and deeply descending, sharply striate. The free part is cylindrical and forms about one-fifth of the total length of the shell. Aperture circular, oblique, with broadly flaring, trumpet-like peristome. Internal axis very slender and gyrate.

Length 17.3, greatest diameter 1.8 mm.

Length 15, greatest diameter 1.7 mm.

Locality, "La Hembrita," Monte Toro.

This charming species is related to *B. brooksiana*, but differs by the less swollen shape, more numerous whorls and shorter "neck" of the last. Moreover, the last whorl is cylindrical in *U. torreana*, but in *U. brooksiana* it has a conspicuous basal keel. Specimens of *U. brooksiana* are figured, pl. I, fig. 5, for comparison with the new species. By the want of a basal keel and the convex whorls, *B. torreana* is more nearly related to *B. turcasiana*, a far smaller species. Named in honor of my friend Dr. C. de la Torre.

The figured types have been deposited in the collection of the Academy of Natural Sciences.

A NEW CUBAN SPECIES OF BRACHYPODELLA.

BY CARLOS DE LA TORRE.

BRACHYPODELLA (GYRAXIS) RAMSDENI, n. sp. Pl. I, fig. 2.

The shell is very slender, the greatest diameter contained 12 or 13 times in the length, whitish, slightly shining, widest at about the upper fourth, composed of about 25 whorls, adult shells usually having lost a few. The whorls are convex, and the last five or six have a rounded ridge (or basal carina) above the suture, and a slight concavity above the ridge. The last half whorl is free and descends spirally in a long "neck," the basal carina prominent on the upper half of the neck, but gradually disappearing, leaving it nearly cylindrical near the aperture, which is triangular-rounded, oblique, and very small. Sculpture of rather irregular, very oblique striæ; the

free part of the last whorl having sharper, more widely-spaced riblets. Internal axis slender, moderately gyrate in the later whorls.

Length 24, greatest diam. 1.8 mm.

Length 22.5, greatest diam. 1.9 mm. (truncate).

Collected at "La Lechuza," Monte Toro, by Mr. Charles T. Ramsden, to whom the species is dedicated.

This is a much larger shell than *B. booksiana* Gundl., with less swollen spire, and much less strongly gyrate axis. The basal carina is visible on more whorls, the neck is shorter, and the sculpture less regular. It is a very interesting addition to the subgenus *Gyraxis*.

REMARKS ON CLASSIFICATION OF THE UNIONIDÆ.

BY L. S. FRIERSON.

In 1820 and in 1831 C. S. Rafinesque published descriptions of a large number of *Unionidæ*. Of these, he is credited in the "Synopsis of the Naiades, C. T. Simpson, 1900," with but seven or eight species. Conrad, having access to specimens labelled by Rafinesque, gave a list of such species as he identified. Except in such cases as when a patent error can be shown we are bound to accept Conrad's identifications.

The fact that Conrad made mistakes at times, can have no weight, for no author is free from these. Conrad, however, only awarded to Rafinesque those species described in 1820. Those described in 1831 have uniformly been dumped by all subsequent authors (known to the writer) in the trash-pile of "indeterminate *Unionidæ*." There is no valid reason for this, as several of these latter species are clearly and unmistakably recognizable. In place of seven or eight species, Rafinesque is entitled to precedence in at least thirty.

An annotated synoptical table is is process of making, and will be published shortly. Because of the important bearing of these facts upon modern classification, this preliminary sketch is given, from the latter point of view, for our author was a genius in the art of proposing *genera*.

(1) LEPTODEA Rafinesque, 1820. Type *leptodon* Rafinesque (= *tenuissimus* Lea). If this species should prove to be congeneric

with *fragilis* Rafinesque (= *gracilis* Barnes) the genus *Pareptera* Ortmann, 1911, must become a synonym.

(2) ELLIPSARIA Rafinesque, 1820. Type (by elimination) *fasciolaris* Rafinesque (= *phaseolus* Barnes) must reduce to synonymy the genus *Ptychobranchus* Simpson, 1900, type *phaseolus* Barnes.

(3) AMBLEMA Rafinesque, 1820. Type (by elimination) *costatus* Rafinesque, 1820, must take the place of *Crenodonta* Schluter, 1836.

(4) HEMISTENA Rafinesque, 1820, (a contraction of *Hemilastena*) proposed tentatively for *Lastena lata*, is of course a synonym. Hence the application of this generic term by Mr. C. T. Simpson, to the *ambigua* Say (= *hildreihianus* Lea) can not stand. For this shell, *ambigua* Say, I therefore propose the new generic term *Simpsonaias*.

(5) EPIOBLASMA Rafinesque, 1831. Type *biloba* Rafinesque, 1831, (= *foliatus* Hildreth) must replace the subgenus *Dysnomia* Agassiz, 1852.

(6) TOXOLASMA Rafinesque, 1831. Type (by elimination) *lividus* Rafinesque, 1831, (= *glans* Lea) must take the place of the subgenus *Carunculina* Simpson, 1900, type *texasensis* Lea, and the group really should have generic standing.

(7) LEMIOX Rafinesque, 1831. Type *rimosus* Rafinesque, 1831 (= *cælatus* Conrad). Since this exceedingly characteristic species deserves generic rank, it must, *for this species at least*, take the place of *Micromya* Agassiz.

(8) DECURAMBIS Rafinesque, 1831. A subgenus proposed for *Alasmodon marginata* Say, variety *truncata* (= *scriptum* Rafinesque) and *atropurpureum* Rafinesque, 1831 (= *raveneliana* Lea). This subgenus must displace *Rugifera* Simpson, 1900.

(9) BARIOSTA Rafinesque, 1831. Type *ponderosus* Rafinesque, 1831, a synonym of *crassidens* Lamarck (= *trapezoides* Lea), is antedated by *Amblema* Rafinesque, unless the *U. crassedens* Lamarck (= *trapezoides* Lea) should prove to be, as Conrad suggested, of a different group from the *plicatus* group.

(10) SULCULARIA Rafinesque, 1831. Type (by elimination) *badium* Rafinesque (= *Marg. holstonia* Lea) must be regarded as a subgenus of *Symphynota* Lea, as constituted by Simpson, 1900, replacing in part the subgenus *Pressodonta* Simpson, 1900.

(11) DIPLASMA Rafinesque, 1831. Type *D. marginata* Rafinesque, must take the place of *Lamellidens* Simpson, 1900, type

marginalis Lamarck. The failure to recognize this well-defined genus by most subsequent authors is a very remarkable fact.

In the preparation of the above remarks I am indebted in a very large degree to my friend Dr. A. E. Ortmann.

MOLLUSKS FROM MAGICIAN LAKE, CASS AND VAN BUREN COUNTIES, MICHIGAN.

BY FRANK C. BAKER.

Magician Lake lies between Van Buren County on the north and Cass County on the south. It is about two and a half miles long and half a mile wide. The banks on the north border are high but on the south, east and west they are for the most part low and swampy. The lake occupies an elongated depression in the Wisconsin drift and contains four deep holes, 40 to 60 feet in depth. The shores are shallow and shelving, and, with the exception of one or two short intervals, one may wade entirely around the lake. The outlet is at the southeast side (known as Silver Creek), and empties into the West branch of Dowagiac Creek, which drains into the St. Joseph River, a Lake Michigan stream. The migrations of the mollusks have probably been largely by the way of the St. Joseph, although some of the species may have reached this spot in post-glacial time via the Kankakee-St. Joseph portage; but the fauna as a whole probably reached these lakes by way of the Chicago outlet when Lake Michigan was in the Lake Chicago stage. It is evident that Magician Lake was once much higher, with a large, wide outlet, for high terraces may be seen on the south, and also bordering the outlet. Ancient marl beds exist, now covered by three feet of peat, containing mollusks of a colder climate, attesting the ancient occupancy of this lake by icy waters.

Mollusks were notably abundant in individuals and species. The species are listed by ecological regions. My thanks are due to Dr. Herman S. Pepoon for assistance in collecting much of the material.

Beach debris South Shore, all dead shells.

Alasmidonta calceola (Lea).
Anodonta grandis footiana Lea.
Lampsilis luteola (Lam.).
Sphaerium simile (Say).
Planorbis antrosus Conrad.
Planorbis antrosus angistomus Hald..
Planorbis parvus Say.

Sphaerium striatinum (Lam.).
Musculium truncatum (Lind).
Valvata tricarinata Say.
Amnicola limosa (Say).
Amnicola lustrica (Pilsbry).
Physa heterostropha Say.
Physa integra Hald..
Physa niagarensis Lea.
Planorbis trivolvis Say.
Planorbis campanulatus Say.
Planorbis campanulatus Say.
Planorbis deflectus Say.
Segmentina armigera (Say).
Galba obrussa decampi (Streng).
Succinea retusa Lea.
Succinea avara Say.
Pyramidula cronkhitei anthonyi Pilsbry.
Zonitoides arborea (Say).
Vitrea rhoadsi Pilsbry.
Polygyra thyroides (Say).

Sandy beach on north side of Lake, water one to four feet deep.

Alasmidonta calceola (Lea).
Anodonta grandis footiana Lea.
Anodonta marginata Say.
Anodontoides ferussacianus subcylindraceus Lea.
Lampsilis luteola (Lam.).
Lampsilis ventricosa (Barnes).
Valvata tricarinata Say.
Amnicola limosa (Say).
Amnicola lustrica Pilsbry.
Campeloma integra (Hald.).
Physa heterostropha Say.
Physa niagarensis Lea.
Planorbis antrosus Conrad.
Planorbis parvus Say (dead).

Marsh above marl bed, east of Magician Lake cottages.

Physa gyrina Say.
Aplexa hypnorum (Linn.).
Planorbis antrosus angistomus Hald.
Paludestrina nickliniana (Lea).

Heavy damp woods south side of lake.

Succinea retusa Lea.
Pyramidula cronkhitei anthonyi Pilsbry.
Zonitoides arborea (Say).
Vitrea hammonis (Ström).
Strobilops virgo (Pilsbry).
Polygyra thyroides (Say).
Polygyra monodon (Rackett).
Polygyra hirsuta (Say).

In swale in woods.

Sphaerium occidentale (Prime).
Aplexa hypnorum (Linn.).
Segmentina armigera (Say).
Galba obrussa (Say).
Galba parva (Lea).

Hemlock Island, west end of lake. The center of the island is about twenty feet above the level of the lake. All shells were found under old bark or fallen pieces of trees.

Succinea retusa Lea (found on vegetation at margin of island).
Zonitoides arborea (Say).
Vitrea indentata (Say).

Helicodiscus parallelus (Say). Strobilops labyrinthica (Say).
Pyramidula cronkhitei anthonyi Pilsbry.

NOTES.

Valvata piscinalis in Canada.— I found last autumn in Homsher Bay, Toronto, inside the "sea-wall," a flourishing colony of *Valvata piscinalis* Müll. There was much rubbish along the shore, including straw and marsh grass, such as is used abroad in packing fragile articles for export; and I have no doubt these little strangers were introduced from England or Eastern Europe in some such material. Another alien—long however known to have become established in the United States and at Cornwall in Ontario—*Bythinia tentaculata* L., abounds nearby, in the lagoons on the islands in Toronto Bay. I may add that these quiet waters also harbor fine specimens of *Anodonta cataracta* Say (*fluviatilis* Dillw.) and *Anodonta grandis* Say. Their occurrence in the same locality should end forever the contention that one is the eastern form and the other the western form of the same species. The same ecological conditions, and the commingling in the same water of the spermatozoa of both, would necessarily result in hybrids or extinction of differences if the two species were not naturally distinct, and each capable of preventing fertilization by the other.—F. R. Latchford.

Some European Mollusca.—The receipt of a new part of Taylor's beautiful monograph of the Land and Freshwater Mollusca of the British Isles reminds me of an observation on *Helicigona arbustorum* var. *alpicola* Fér., a small rather elevated variety of a yellowish color, with one band or none, which I found on the summit of the Rigi, in Switzerland. The soft parts were uniformly pale reddish instead of dark, and although Taylor states that the animal of this species varies independently of the shell, it seems possible here the two things go together, the *alpicola* form being perhaps a valid subspecies. At Zürich and Gersau, Switzerland, I found typical *arbustorum;* at the latter place also the yellowish bandless form. The varieties of *H. arbustorum*, with additional bands, figured by Taylor, are very interesting, but certainly the form with an

extra band below the principal one should be separated from the true *bifasciata*, in which the extra band is above. Taylor's pl. XXXIV, f. 13, may accordingly be called v. *infrafasciata*. At Wangen, Baden, I noted that the *Helix pomatia* were of full size, distinctly larger than the form observed in Switzerland (Gersau, Fluelen). Observations on the variation of *H. nemoralis* and *hortensis* yielded nothing of special interest; at Wangen *H. hortensis* v. *lutea* with bands 00000, 123(45) and 1(23)45. At Schaffhausen *H. hortensis lutea* 00000. At Gersau *H. hortensis lutea* 12345. At Fluelen *H. nemoralis rubella* 00000. At Zürich the *Arion ater* was dark reddish brown, with bright orange-vermillion foot-fringe. At Wangen the *A. ater* presented the beautiful bright red var. *rubra*, which I had never had the pleasure of finding before, but also the red-brown variety. At Troyes, France, *Helix fruticum* was found in both the reddish and whitish varieties. I was pleased to find *Helicodanta obvoluta*, which I had never collected before, at Brugg, Switzerland. *Helicigona lapicida* was found at Brugg and at Wangen.—T. D. A. Cockerell.

Rumina decollata in Texas.—Mr. Camp found a large colony of *Rumina decollata* Linné, in a Brownsville, Texas, garden, and succeeded in getting a few without losing the points, carrying them in cotton. They are larger than my Charleston or New Orleans specimens and less uniform in general architecture. The largest measured 30⅝ alt., 11 mm. diam.—J. H. Ferriss.

Land Shells from Sussex Co., N. J.—The following species were picked from leaf mould collected by Mr. Bayard Long, near Big Spring, Springdale, near Newton, Sussex Co., N. J.:

Polygyra albolabris (Say).
Polygyra hirsuta (Say).
Polygyra monodon fraterna (Say).
Bifidaria armifera (Say).
Bifidaria contracta (Say).
Bifidaria corticaria (Say).
Bifidaria pentodon (Say).
Vertigo gouldii Binn.
Vertigo milium Gld.
Cochlicopa labrica (Müll.).
Vitrea indentata (Say).
Euconulus chersinus (Say).
Euconulus sterkii (Dall.).
Zonitoides minuscula (Binn).
Gastrodonta suppressa (Say).
Pyramidula alternata (Say).
Pyramidula cronkhitei anthonyi Pils.
Punctum pygmæum (Drap.).
Carychium exile H. C. Lea.

The entire set was donated to the Acad. Nat. Sci. of Philadelphia. *C. exile* and *P. c. anthonyi* were the most abundant forms in the collection, and *E. sterkii* is, I believe, new to the State.—E. G. VANATTA.

NOTE ON CIRCINARIA CÆLATA MAZYCK.—In the Catalogue of American Land Shells published in NAUTILUS XI. (p. 128), this form was subordinated to *C. duranti*, as a sub-species. By the courtesy of Mr. Mazyck, I have been able to examine the type specimen of *cælata*. On going over the series in the collection of the Academy, no specimens were found connecting it with *duranti*, and I now believe it to be a distinct and well-characterized species, one of the handsomest of the genus.—H. A. PILSBRY.

MR. A. A. HINKLEY made a brief mid-winter journey to Guatemala, obtaining some interesting additions to his former collections there. A fine series of the large Pachycheiti of Lake Ysabel and environs was taken. Among the land shells he secured a good series of the splendid *Cælocentrum gigas* v. Mart.—H. A. P.

PUBLICATIONS RECEIVED.

A PRELIMINARY LIST OF THE MOLLUSCA OF MISSOURI (exclusive of the *Unionidæ*).—By F. A. SAMPSON. Trans. of the Academy of Science of St. Louis, xxii, July 18, 1913. The various State catalogues which have been brought out in the last ten or fifteen years have recorded data of great value to the student of distribution of mollusks, indispensable to inquiries into the origin and migrations of the several groups of our fauna. Missouri is an especially interesting state. Lying near the western border of the humid area, the northern border of the Ozarkian fauna, and within the peripheral range of some Austral forms, it is an area where numerous species reach their extreme range. Mr. Sampson has given in this catalogue the results of many years of work in the state, a total of 117 species and varieties, and some 900 locality records. Among the species first described from Missouri we note two not in Mr. Sampson's list: *Polygyra blandiana* Pils. and Ferr. and *Amnicola missouriensis* Pils.—H. A. P.

The Nautilus.

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NOTES ON SOME NORTHWEST COAST ACMAEAS.

BY WILLIAM H. DALL.

Since Dr. Philip Carpenter's review of the Acmaeas of the Northwest Coast (Am. Journ. Conch., II, 1866) all writers on the subject, including myself, have to a large extent, if not entirely, accepted his conclusions as to their nomenclature.

Having occasion to revise the magnificent series of these shells in the National Museum, I have recently reviewed the whole nomenclature from the beginning, and to my surprise and dismay found that Dr. Carpenter, in his desire to perpetuate the manuscript names of his friend Thomas Nuttall, had frequently ignored the rules altogether, had adopted names which he knew to be preoccupied, and in several cases misidentified early authors' species. Mr. Robson of the British Museum had intimated to me some time ago that the nomenclature of these limpets was in a very bad state of confusion, but until I came to work over them myself I had no realization of the true condition.

In extenuation it must be remembered that fifty years ago the necessity of strictly conforming to the rules was little appreciated, and many excellent naturalists of that day are responsible through their carelessness for much of the trouble now encountered.

In reviewing the work of an author who like Eschscholtz gave several names to mutations of the same species, the most acceptable way is to take his first name for the consolidated species and put the others in synonymy. Dr. Carpenter, however, in choosing in such

cases did not follow this method. However, as the first reviser, his selection may be considered final, or we should practically have to change all his names. In the space here available it is not practicable to give a full discussion, but the final results may be noted.

Acmaea cassis Eschscholtz, is a splendid form of *A. pelta* (Esch.) Cpr., and *A. fimbriata* Gould, is synonymous. *Acmaea pelta* Cpr., has five or six synonyms, and as tolerably distinct mutations includes *nacelloides* Dall; *monticola* pars (Nutt.) Cpr.; and *olympica* Dall (Pilsbry, Man., pl. 8, figs. 92, 93, 94).

Acmaea patina (Esch.) Cpr., has many synonyms, and, as recognizable mutations, *ochracea* Dall; *emydia* Dall (the Arctic *testudinalis* of my 1871 paper); *cribraria* (Gld.) Cpr.; and *parallela* Dall; the latter corresponding to the *A. alveus* of the Atlantic coast.

Acmaea persona Eschscholtz, is not Carpenter's *persona* (which is a mutation of *digitalis* Esch.) but is the shell Carpenter called *cumingii* in 1866; though not the same as the prior *cumingii* of Reeve. *A. persona* is a fine species, and I have a large series ranging from Alaska Peninsula to Socorro Island.

Acmaea digitalis Eschscholtz, is the northern form which merges into *umbonata* (Nutt.) Reeve, southward; and then into *textilis* Gould, at its southernmost range. Part of Gould's *scabra* of 1846 is the same as *textilis* Gld. + *persona* Cpr. (not Esch.) + *oregona* (Nutt. MS.) Cpr.

Acmaea scabra Gould, 1846 (from type), is the shell later named *spectrum* (Nutt. MS.) Reeve, and is generally known under the latter name, which of course must be discarded.

Acmaea scabra (Nutt. MS.) Reeve, 1855 (not of Gould, 1846), must take the earliest synonym, which seems to be *limatula* Cpr., 1866.

Acmaea var. *funiculata* Cpr., merges by imperceptible degrees into the later *tenuisculpta* Cpr., and that into *mitra* Eschscholtz.

Acmaea persona Esch. (not Cpr.), merges southward into *strigillata* Cpr.

Acmaea semirubida Dall, resembles *triangularis* Cpr., but is more oval in outline, with crimson rays on a white ground; it ranges from the Gulf of California to Panama.

Scurria aeruginosa (Midd., 1847, as *Patella*, with a wrong habitat) is an earlier name for the shell generally known as *mesoleuca* Menke, 1851, from the Gulf of California.

In studying these mollusks it is necessary to remember that the different species often have an almost identical series of color variations, so that if one is guided chiefly by color, there is a liability to put together mutations belonging to different species. There is little doubt that food greatly influences and directly changes both the color and texture of the outer layers of the shell, while the form is directly related to the situs of the individual.

An interesting fact in the distribution of these animals is the evidence they give in favor of the probability of the former existence of an elevated ridge or range roughly parallel with the coast of California and the peninsula, and of which the Santa Barbara Islands, Guadelupe, and Socorro are the only supermarine indications at the present day. It looks as if there was a second gulf or inlet between this range and that of Lower California, so that the cool-temperate species were able to extend as far south as Socorro on the western coast of the western range, while the more tropical forms were able to reach far to the North in the warmer waters of the inner area between the outer range and the continent to the east of it, including what is now the Gulf of California.

POSTPLIOCENE SHELLS OF PROVIDENCE AND LUPUS, MISSOURI.

BY F. A. SAMPSON.

Several trips to these two places have given many specimens. Providence, Boone County, is on the north side of the Missouri river, a place now of only a few houses, but formerly, in the days of steamboat travel on the river, a large town and important shipping point. The grading for the Missouri, Kansas and Texas railroad along the river cut into the bluffs, and uncovered the deposits containing great numbers of postpliocene land shells. The deposit is of later period than the Kansas loess, and is not the fine silt of the loess, but is of clay intermixed with stones of various sizes.

Lupus is almost opposite on the other side of this river, in Moniteau County, where the grading for the river route of the Missouri Pacific railroad uncovered the beds with the fossil shells. A mile above Lupus was the former town and steamboat landing of Mt. Vernon, a town of which no trace now remains. On both sides of the river the rocky bluffs are of Chouteau limestone, resting on beds

of Devonian, and capped by Upper Burlington limestone. The Chouteau fossils, especially the crinoids, are interesting, and the type specimen of one species came from Mt. Vernon, while Providence has given the types of many fossils.

The most of the shells found at both places are now found living in the neighborhood, while others have not been found in any nearby county. The following species have been collected:

Polygyra profunda Say. The largest of the Providence shells are of 31 mm. diameter, but the Lupus shells up to 34 mm. averaging smaller size, but more plentiful and some preserving the color band. So far this has not been found living in the state except at Courtney, in Jackson County, near Kansas City.

Polygyra albolabris alleni Weth. At both places fine shells from 26 to 32½ mm. diameter are common, and more plentiful at Lupus. The living shells have been found in the neighborhood to about the same size, but from a rock pile in an open field near Columbia they were only 23 to 25 mm. and very similar to the still smaller ones found in a cemetery at Kansas City.

Polygyra thyroides Say. Of fifty shells picked up at Providence thirty-six were *thyroides edentata*, and of thirty-seven at Lupus twenty-five were the same.

Polygyra elevata Say. Not much variation in size, somewhat smaller at Lupus, and all similar to the living ones found on both sides of the river. Some that seemed to have been entirely mature were edentate.

Polygyra clausa Say. Scarce at both places.

Polygyra pennsylvanica Green. This is rather uncommon at both places. A walk of three miles along the railroad, during which many thousand shells were picked up or seen, gave but a single one of this species. It is not now found living in this part of the State.

Polygyra appressa Say. These are of the three-tooth variety found rather plentifully in many places in Missouri. On both sides of the river the shells vary much in size, many being larger than those now living in the neighborhood. It is the most plentiful shell at Providence, but scarce at Lupus. The shells varied in size from 15 to 22 mm., and many of the smaller ones have only a trace of lip teeth.

Polygyra inflecta Say. Sparingly found at both places, but sometimes uncertain as to whether fossil, or simply dead shells that had dropped from higher parts of the bluff.

Polygyra fraterna Say. The same may be said of this as of the last. From both places.

Polygyra monodon Rack. From both places.

Polygyra hirsuta Say. Sparingly at both places. The ordinary size is of 7 mm. diameter, but one from Providence is of 9 mm. and somewhat differing from the smaller ones in other respects.

Succinea ovalis Say. A single one found at Lupus.

Gastrodonta ligera Say. A single one was found at Lupus. At some places in Boone county the living ones are plenty.

Helicina occulta Say. In my report of the Shells of Missouri this was given as *Helicina orbiculata tropica*. It is rather scarce on both sides of the river, and has never been found living in the State.

Vitrea indentata Say. From Lupus.

Vitrea hammonis Strom. Some young shells from Lupus were probably of this species.

Zonitoides minusculus Binne. From Lupus.

Zonitoides milium. From Lupus.

Bifidaria armifera Say. At Lupus.

Bifidaria contracta Say. These and other minute shells were not found imbedded in the dirt, but in clearing the larger *Polygyra* of the dirt that filled them a number of small shells were found. These and some smaller *Pupillidæ* that have not been identified, were found at Lupus.

Pyramidula solitaria Say. This at Providence is perhaps as abundant as *P. appressa*, but at Lupus it is rare and somewhat smaller.

Pyramidula alternata Say. At Providence they are of good size and not plenty; at Lupus rare and smaller.

Pyramidula perspectiva Say. A single specimen was found at each place.

Helicodiscus parallelus Say. From Lupus.

Carychium exile H. C. Lea. From Lupus.

An idea of the comparative number of the species may be had from the results of a walk along the railroad for three miles on the Providence side, during which hundreds of shells were picked up or seen, among which were only four *profunda*, one *pennsylvanica*, one *clausa*, and one *alternata*, while *soltiaria* and *appressa* were abundant, and *elevata* next in abundance.

ADDITIONS TO THE LIST OF MAINE MOLLUSCA.

BY N. W. LERMOND.

Since the publication of my Catalogue of the Mollusca of Maine in 1909, the following species and varieties, some new some old, have been added to the list:

MODIOLARIA SUBSTRIATA, Gray.

One young specimen of this species was collected by John A. Allen. It was attached to an old bottle in Portland Harbor, near Hope Island.

MACOMA TENTA, Say.

Four dead specimens were taken by the writer in Aug., 1909, in the Georges River, near Taylor's Point, Cushing Shore, in six fathoms, on a muddy bottom.

Specimens were submitted to Prof. Pilsbry for determination.

ODOSTOMIA (MENESTHO) BISUTURALIS OVILENSIS, Bartsch.

The type of this subspecies was taken by Henry W. Winkley in Sheepscott River, Lincoln County. See Bartsch's Pyramidellidæ of New England and Adjacent Region, p. 107.

TURBONILLA (PYRGISCUS) CASCOENSIS, Bartsch.

"The type and two additional specimens, Cat. no. 203,795 U. S. N. M., come from Casco Bay, Maine." See page 96 of Bartsch's Pyramidellidæ. Dr. Bartsch does not state when, or by whom, these specimens were collected.

CINGULA HARPA, ——?

One specimen taken by Henry W. Winkley, at Eastport summer of 1913. Of this rare find, Mr. Winkley writes me as follows: "I think my identification correct. Formerly reported from 150–500 fathoms. I like to capture a stray bird now and then—it is fine sport."

COLUMBELLA (ASTYRIS) LUNATA Say.

Several live specimens of this species were dredged by Henry W. Winkley in the Sheepscott River at Damariscotta and by myself in Maple-juice Cove and Broad Cove, near mouth of the Georges River, Knox Co., during the summer of 1912. The latter locality is the most northern record for this species.

RETUSA OBTUSA var. TURRITA.

Reported by Mr. Dwight Blaney from Frenchman's Bay.

MUSCULIUM ROSACEUM Prime.

A few specimens (immature) taken by Dana W. Sweet in Sandy River, Franklin County, and by the writer in Georges River, North Warren, Knox County.

MUSCULIUM RYCKHOLTI Normand.

Fairly plentiful in the small ponds of Warren and Thomaston, Knox County.

MUSCULIUM PARVUM St (?).

Six specimens of a Musculium were collected by the writer during past season in the Georges River at North Warren, Knox Co., and sent to Dr. Sterki for determination.

MUSCULIUM SECURIS ("form or even variety," Sterki).

Collected August 17, 1913, in Georges River, North Warren.

They were returned labeled as above.

MUSCULIUM WINKLEYI St.

Taken at Saco, York County, by Henry W. Winkley, and at Avon, Franklin County, by Dana W. Sweet.

PISIDIUM MONAS St.

Six specimens—one nearly full grown, others juv.—taken August 17, 1913, in Georges River, North Warren, by the writer.

Dr. Sterki, to whom the material was submitted, remarks as follows: "rather like the type from Michigan. Some examples, probably of same, though a little larger, from Aroostook Co. (Nylander)."

PISIDIUM PUNCTATUM var. SIMPLEX St.

Two specimens, almost full grown, taken by the writer in George River, North Warren, Aug., 1913.

PISIDIUM VARIABILE var. CICER Pr.

Eleven immature specimens taken at same time and place as above.

PISIDIUM MINUS (Adams).

A few specimens taken by the writer in Black River, Warren, Knox Co., season of 1909, and in Mill River, Thomaston, 1909 and 1910.

PISIDIUM ABDITUM var. LACTEUM St.

Two live specimens and a few single valves taken in Georges River, North Warren, season of 1913.

PISIDIUM SPHAERICUM St.

About twenty specimens, mostly immaculate, a few nearly full grown, taken Aug., 1913, in Georges River, North Warren.

AMNICOLA SCHROKINGERI Frauenfeldt.

Collected by Rev. Henry W. Winkley, at Saco, York county.

LYMNÆA DESIDIOSA var. PLICA Lea.

Collected in Buckfield, Oxford County, by John A. Allen.

PLANORBIS HIRSUTUS Gld. (= albus Müll) and P. DEFLECTUS Say.

Were inadvertently omitted from my published list. The former has been reported from Aroostook, Knox and Penobscot counties; the latter from Aroostook, Knox, Oxford and Penobscot counties.

VERTIGO NYLANDERI St.

Woodland, Aroostook Co. (Nylander). See NAUTILUS, Vol. XXII, p. 107.

STUDIES IN NAJADES.

BY DR. A. E. ORTMANN.

(*Continued from Vol. XXVII, p. 91.*)

FUSCONAJA ASKEWI (Marsh). (See: *Quadrula a.* Simpson, 1900, p. 786.)

A number of specimens, among them males, sterile and gravid females, from Sabine River, Logansport, De Soto Par., Louisiana, were received from D. S. Frierson, mostly collected on August 1, 1912, but one gravid female was collected on September 21.

In all females (altogether eleven) all four gills had marsupial structure, and in five gravid ones all four gills were charged. But in one gravid individual only the outer gills contained glochidia; but the inner gills had distinctly marsupial structure. Since there were placentæ and fragments of them in the suprabranchial canals and the cloaca cavity, this specimen was caught in the act of discharging.

The breeding season probably ends in August, but the gravid specimen, with glochidia, collected on September 21, is remarkable. It

seems that in lower latitudes the breeding time does not depend strictly on the season. For instance, I have a gravid female, with eggs, of *Fusconaja undata* (Barnes) from the Ouachita River, Arkadelphia, Clark Co.. Arkansas, collected by H. E. Wheeler on September 3, 1912, while another one, recorded previously (Ortmann, 1912, p. 241) was obtained in the same condition March 21, 1911.

F. askewi has a short mantle connection between anal and supra-anal, which was absent (torn ?) in a few cases. Anal with very fine papillæ, branchial with distinct papillæ. Inner lamina of inner gills free from abdominal sac, except at anterior end. Posterior margins of palpi connected for about one-half of their length or a little less.

In the female, all four gills are marsupial. Placentæ well developed, subcylindrical, and, according to a communication from Frierson, red "in most cases." Glochidia without hooks, semielliptical, higher than long. Length, 0.13, height, 0.15 mm.

Color of soft parts partly destroyed in alcohol, but there are indications that mantle edge, adductors, and foot, had a more or less pronounced tendency to be orange-brown. Frierson informs me, that in life the soft parts may be orange or whitish.

This species clearly belongs in the *undata-trigona-rubiginosa* group, and is not at all related to the species with which it has been placed by Simpson (1900, p. 786), at any rate, it is not related to *Elliptio beadleianus* (Lea) (see Ortmann, l. c. p. 268), although it resembles this species somewhat in the shell; but this is clearly a case of convergency.

Crenodonta perplicata (Conrad) (See Ortmann, 1912, p. 248).

A gravid female, with glochidia, was received from H. E. Wheeler, from the "Old River" of the Ouachita River, Arkadelphia, Clark Co., Arkansas, collected June 26, 1911. Another discharging female, is at hand from Sabine River, Logansport, De Sota Par., Louisiana, collected by L. S. Frierson, August 1, 1912.

Also in this species the breeding season seems to be subject to considerable variation: ripe glochidia are present as early as June 26, and as late as August 6.

The glochidia of the present specimens are absolutely like those observed previously. Length, 0.20; height, 0.21 mm.

Quadrula pustulata (Lea) (See Simpson, 1900, p. 781).

Wabash River, New Harmony, Posey Co., Indiana, collected

Aug. 8, 1912, by A. A. Hinkley. Aside from several very young ones, the sex of which could not be ascertained, there were two large males, and a gravid female, discharging glochidia. The date (Aug. 8) indicates the end of the breeding season.

Anal opening separated from the supraanal by a short mantle-connection, but in the largest male the two openings are united, the mantle-connection being undoubtedly torn. Anal with the inner edge almost smooth, branchial with distinct papillae. Posterior margins of palpi connected for about one-half of their length.

Inner lamina of inner gills free from the abdominal sac, except at anterior end. In the female, all four gills are marsupial. The shape of the placentae could not be observed, since the female was discharging, and the glochidia filled the suprabranchial canals and cloacal cavity in large, loose masses. But many glochidia were yet lodged in all four gills.

Glochidia subovate, higher than long, of medium size. Length, 0.20; height, 0.24 mm.

Color of soft parts apparently of the whitish type.

This is a true *Quadrula*, allied in its shell characters to *Q. lachrymosa* (Lea). From *Q. pustulosa* (Lea) it is rather sharply distinguished by the glochidia, which are considerably larger in the latter species, 0.23×0.30 according to Lefevre and Curtis (Journ. Exp. Zool., 1910, p. 98, fig. 1, F), while I found them (in specimens from West Virginia) to be 0.22×0.29 mm.

(*To be continued.*)

NOTES.

Another Giant Squid in Monterey Bay.—Since the publication of my note in the Nautilus of February, 1912, I have been informed of the occurrence of another big squid in the same region as the one previously reported. Hoping to secure further details, I laid the note to one side, but as no further data have been forthcoming, it may be well to publish the record that it may not be lost. Such information as I have been able to obtain was furnished to Dr. Harold Heath of Stanford University by Mr. K. Hovden, Manager of the Booth Canning Company at Monterey, who happened to be fortunate enough to see the specimen.

About October 12, 1912, some Italian fishermen in Monterey Bay

encountered and captured an immense squid, thereupon bringing it to shore. Its gross measurements I have been unable to ascertain, but the animal is stated to have weighed close to 500 pounds. The arms were about a yard long, and the general color of the animal a dark red. Mr. Hovden endeavored to purchase the specimen for five dollars, but this sum was refused by the fishermen, who devoured the prize raw.—S. S. BERRY.

LARGE SQUID on the Oregon coast, is thus reported by the Newport (Oregon) Journal.—Mrs. C. L. Hansen, wife of the lightkeeper at Heceta lighthouse, 30 miles south of here, and her daughter discovered a squid half out on the rock but a few yards away. Several of the long tentacles were reaching further, while the ugly head with the parrot-like beak was well out of water. The huge goggle eyes were fixed upon the two people. Mrs. Hansen called to her husband, and the squid slipped back into the water as he approached. It could be plainly seen, however, alongside the rock. Mrs. Hansen then called Fred Deroy, the assistant keeper, and with a long gaff hook and grappling rakes the two men succeeded in landing and killing the monster. The tentacles were seven feet long and the body 28 inches, making it over 16 feet from tip to tip. The body proper was over six feet long and of mottled brown color. It had a diamond-shaped tail about 27 inches across.

NOTE ON THE CLASSIFICATION OF THE ANCYLIDAE.—Dear Editors: The receipt of the February number of the NAUTILUS has recalled to my attention the fact that for nearly two years I have before me without opportunity to complete it a paper on the classification of the Ancylidae that had circumstances been otherwise would have prevented a serious misunderstanding on the part of Mr. Walker of my ideas on the ancestry of the fresh-water limpets. That Grabau's statement that "our modern patelliform species are probably not primitive types" is, I think, plausible, but it is nevertheless true that several families of the fresh-water pulmonates show by their development a much more recent simple patelliform stage such as I described that probably does not have anything to do with the primitive stage indicated by Grabau.

I very much doubt that the dextral genera *Lanx*, *Fisherola*, *Laevapex*, *Acroloxus* and *Gundlachia* are actually as closely related to *Ancylus*, *Brondelia*, and *Ancylastrum* as supposed. The latter

genera in their late development, if they do not maintain it to maturity, possess a coiled shell and upon this the limpet-like shell of *Ancylus* is secondarily developed. It may be further noticed that these latter genera are all sinstral and I am under the impression that the anatomy corresponds closely. At any event it is quite different from that of *Lanx*, *Laevapex* (*Ferrissia*) and *Gundlachia*, which do not show any evidence in their post-embryological development that they ever possessed a coiled shell though I suspect they did at one time far back in their history. I have been hoping to study the early development of one of these genera but it is a little out of my line at present. The latter genera should, I think, at least be segregated in another family, the Laevapecidae, with subfamilies *Laevapecinæ* and *Lancinæ*, and probably another subfamily for the secondarily coiled forms that may belong here. In this case my statement regarding the simple patelliform ancestors would refer to this family since it was the development of these and not that of the Old World group that I studied.

In regard to the generic classification of the Laevapecidæ there is opportunity for considerable disagreement of opinion. I[1] have called attention to the fact that in *Lanx*, *Fisherola* and *Zalophancylus* the sculpture is solely concentric and the apex lies along the medial line, the genera being distinguished chiefly by the position of the apex, which may be central, sub-central, or terminal, arbitrary characters perhaps, but ones which run through a number of species that seem to group together in other respects. In *Gundlachia*, *Kincaidilla*, *Laevapex*, and *Ferrissia* the problem is much more difficult. I am not by any means sure that I can always tell a non-septate *Gundlachia* or *Kincaidilla* from a *Ferrissia*. Our local species look easy; but after comparing Walker's figures of African Ferrissias I would not hesitate to call most of the latter non-septate Gundlachias, though I believe Walker knows Ferrissias better than I do.

I am sorry that Walker has not examined the post-embryonic stages of some large Ferrissia that actually shows the development from *Laevapex*. Both *Ferrissia* and *Lanx* show unmistakable indications of derivation from a very low-spired form such as is represented by *Laevapex* and *Walkerola* respectively, as I have observed in at least two species in the former genus and three in the latter. This form I should regard as the least specialized modern type among the Laevapecidæ.—Harold Hannibal.

[1] Proc. Mal. Soc. Lond. x, 1912, p. 147 ff.

THE NAUTILUS.

VOL. XXVIII. JULY, 1914. No. 3

THE MARINE MOLLUSCAN FAUNA FROM THE VICINITY OF BOLINAS BAY, CALIFORNIA.

BY BRUCE L. CLARK.

Bolinas Bay lies about ten miles to the north of the Golden Gate. It is one of the few coves along the rocky coast of Marin County where good collections of marine shells may be obtained. W. M. Wood in vol. xi, no. 5, p. 49 the NAUTILUS, describes Bolinas Bay as the "Conchologist's Paradise;" certainly there are very few places along the coast of middle California where specimens may be found in such great abundance.

At Bolinas we find two different types of shore line, the long spit which nearly cuts off the bay from the ocean and the rocky beach. Duxbury Reef, about two miles to the southwest of the town of Bolinas, extends out into the ocean for over a mile. This is bared at low tide and is one of the best localities that can be imagined for collecting certain rock-loving species. For a more complete description of this locality the reader is referred to the paper mentioned above.

In March, 1913, the Pacific Conchological Club took a trip to Bolinas Bay for the purpose of making collections at that point. The material collected on this excursion was turned over to the writer for determination. This collection was considerably augmented by Mr. Daniel Emery, who visited Bolinas Bay at a later date. He collected out on the reef and

obtained certain species that had never been reported in this vicinity before.

The list of species given below is the largest ever reported from Bolinas Bay. It includes a number of forms that had heretofore not been reported as far north. Two other lists of species from this locality have been published, one by Robt. E. C. Stearns in 1866, the other by W. M. Woods in 1897. Mr. Stearns published a list of eighty-three marine species.[1] Mr. Wood, to whose paper reference has already been made, listed seventy-nine species. The number of species in the collection of the Pacific Conchological Club is ninety-seven. To this may be added those listed by Stearns and Wood and not found in the Pacific Conchological Club collections, making a total of one hundred and twenty-seven species from this locality.

Species collected at Bolinas Bay by the Pacific Conchological Club.

Amphineura

Ischnochiton raymondi Pils.
Cryptochiton stelleri Midd.
Mopalia vespertina Gould
Mopalia muscosa Gould

Pelecypoda

Adula falcata Gould
Adula stylina Carpenter
Anomia lampe Gray
Cardita subquadrata Carpenter
Cardium corbis Martyn
Chama exogyra Conrad
Chama pellucida Sowerby
Cryptomya californica Conrad
Macoma balthica Linnaeus
Macoma *cf.* inflatula Dall
Macoma inquinata Deshayes
Macoma nasuta Conrad
Macoma secta Conrad
Macoma, n. sp.?
Modiola recta Conrad
Monia macrochisma Deshayes
Mytilus californicus Conrad
Mytilus edulus Linnaeus
Paphia tenerrima Carpenter
Paphia staminea Conrad
Paphia staminea rugerata Desh.
Paphia staminea Conrad var. orbella
Parapholas californicus Conrad
Petricola carditoides Conrad
Pecten giganteus Gray
Pecten hastatus Sowerby
Pholadidea penita Conrad
Platydon cancellatus Conrad
Saxicava pholadis Linnaeus

[1] Proc. Calif. Acad. Sci., vol. iii, p. 275.

Saxicava rugosa Linnaeus
Saxidomus nuttalli Conrad
Schizothærus nuttalli Conrad
Semele rubropicta Dall
Siliqua lucida Conrad
Siliqua nuttalli Conrad
Solen sicareus Gould
Spisula catilliformis Conrad
Tellina bodegensis Hinds
Tellina buttoni Dall
Zirphea crispata Linnaeus
Xylotrya setacea Tryon

Gasteropoda

Acmæa asmi Middendorf
Acmæa scabra Eschscholtz
Acmæa spectrum Reeve
Acmæa mitra Eschscholtz
Acmæa pelta Eschscholtz
Acmæa patina Eschscholtz
Acanthina engonata Conrad
Amalthea cranoides Carpenter
Amphissa corrugata Reeve
Amphissa versicolor Dall
Bittium eschrichti Midd.
Calliostoma costatum Martyn
Cerithidea californica Hald.
Chrysodomus dirus Reeve
Columbella (Astyris) gausapata Gould
Columbella (Astyris) gausapata carinata Hinds
Crepidula adunca Sowerby
Crepidula nivea Gould
Diala sp.?
Epitonium indianorum Hinds
Fissuridea aspera Esch.
Haliotus rufescens Swains
Haliotus cracherodii Leach
Lacuna porrecta exaequata Carpenter
Littorina planaxis Philippi
Littorina scutulata Gould
Margarites acuticostatus Cpr.
Megatebennus bimaculatus Dall
Nassa cooperi Forbs
Nassa fossata Gould
Nassa mendica Gould
Nassa perpinguis Gould
Ocinebra lurida munda Cpr.
Ocinebra lurida Middendorf
Ocinebra interfossa Cpr.
Odostomia tenuis Carpenter
Olivella biplicata Sowerby
Olivella intorta Carpenter
Polynices lewisii Gould
Polynices draconica Dall
Purpura foliata Gould
Tegula funebrale A. Adams
Tegula brunnea Philippi
Tegula montereyi Kien
Tegula pulligo Martyn
Thais lamellosa Gmelin
Thais lima Martyn
Thais saxicola Valenciennes
Turris incisa Carpenter
Turris ophiderma Dall

Species collected by Robt. E. C. Stearns at Bolinas Bay and not found in the collection of the Pacific Conchological Club.

Amphineura

Tonicella lineata Wood

Pelecypoda

Clidiophora sp.

Macoma secta var.edulis Nutt.
Pholadidea ovoidea Gould
Semele rubiolineata "auct. non Conrad"
Venerupis lamellifera Con.

Gasteropoda

Acmaea insessa Hinds (Nacella insessa Hinds)
Acmaea instabilis Gld. (Nacella instabilis Gld.)
Acmaea triangularis Cpr.[1]
Fissuridea murina Dall (Glyphis densiclathrata Rve.)
Lacuna unifasciata Cpr.
Lacuna solidula Sby.
Muricidea californica Hinds
Murex trialatus Sowerby
Ocinebra lurida Midd. var. aspera Bairs
Tegula montereyi Kien (Chlorostoma pfeifferi Phil.)
Thais lamellosa var. ostrina Gould

Species collected by W. M. Wood at Bolinas Bay and not found in the Pacific Conchological Club collections or in the list given by Stearns.

Amphineura

Mopalia hindsii

Pelecypoda

Entodesma saxicola Baird
Kellia laperousii Deshayes
Lithophagus plumulata Hanl.
Lyonsia californica Conrad
Mytilimeria nuttalli Conrad
Pholadidea parva Tryon
Saxicava arctica Linn.

Gasteropoda

Crepidula navicelloides Nuttall (C. nivea Gould)
Haliotes fulgens Phil.
Hipponyx tumens (Amalthea tumens Cpr.)
Margarites pupilla Gould

STUDIES IN NAJADES.

BY A. E. ORTMANN.

(*Continued from page 22.*)

LEXINGTONIA nov. gen.

Shell subquadrate or subtrapezoidal, with slightly elevated beaks, and well developed hinge teeth. Beaks not much an-

[1] According to Keep probably a variety of A. paleacea Gld.

terior. Outer surface without sculpture. Epidermis lighter or darker brownish, with rather indistinct rays, which are narrower or wider, and do not break up into blotches. Beak sculpture distinct, consisting of rather numerous (six to eight), rather crowded, subconcentric ridges, which form an indistinct, rounded angle upon the posterior ridge, and are in front of this somewhat wavy and corrugated, but without showing any distinct zigzag pattern. Toward the disk, they disappear. Nacre whitish or pinkish.

Soft parts more or less orange. Anal separated from the supraanal by a well-developed mantle connection, which is shorter than the anal. Anal with small, but distinct papillae, branchial with somewhat larger papillae. Inner lamina of inner gills free. Only the outer gills are marsupial in the female, when gravid, they swell but little, and the placentae are subcylindrical (not compressed and lanceolate), rather solid, and of red color. Glochidia semielliptical, of medium size, without hooks.

Type: *Unio subplanus* Conrad.

This genus stands near *Pleurobema* and *Elliptio,* and differs from either chiefly by the subcylindrical, red placentae, and by the beak sculpture. The placentae resemble much those of *Fusconaja,* but this genus has all four gills marsupial, and the beak sculpture is much more simple. In the beak sculpture, *Lexingtonia* is peculiar, and might even be said to approach *Rotundaria.* The general shape of the shell much resembles that of *Fusconaja rubiginosa* (Lea). *Lexingtonia* apparently is a collective type, uniting characters found in several other genera, with one character of its own (beak sculpture), and thus the best way out of the difficulty is to create a new genus, which stands between *Fusconaja* on the one side, and *Pleurobema* and *Elliptio* on the other.

Lexingtonia subplana (Conrad). (*Unio subplanus* Conrad, Monogr. Union. 9, 1837, p. 73, pl. 41, f. 1, from "branch of James River" (=North River), Lexington, Rockbridge Co., Va.—Simpson, Pr. U. S. Mus., 22, 1900, p. 720: "North Carolina and Virginia").

I found seven specimens of this species. One was found at

the type-locality on June 7, 1912, and proved to be a gravid female, with the glochidia fully developed. The others were found about 7 or 8 miles below in North River, above Buena Vista, Rockbridge Co., Va.: 2 males, 2 sterile, and 2 gravid females, one of the latter with eggs, the other with the glochidia just beginning to form. The largest is a male, length 40.5, height 27.5, diameter 13.5 mm., the next largest, a female, measures, length 40, height 27, diameter 15 mm.

The shape of the shell is somewhat variable: Conrad's figure represents a rather long specimen; I have such specimens, but others are shorter. The figure shows no trace of rays, but sometimes these are rather distinct.

In Simpson's system (l. c., pp. 719-720), this species forms the group of *U. striatulus,* together with three others: *striatulus* Lea, *amabilis* Lea, and *brimleyi* Wright. I have no doubt that these are indeed closely allied, and should not be astonished, if they finally should prove to be all the same species. Of *striatulus* and *brimleyi* I am rather strongly inclined to think that is the case.

The essential characters of the soft parts have been mentioned in the description of the genus. It should be noted that the mantle connection between anal and supraanal is present in all of my specimens, and although shorter than the anal, is better developed than in the species of *Fusconaja, Quadrula, Plethobasus,* and *Pleurobema.* The comparatively distinct papillae of the anal should also be noted.

The color of the abdominal sac and the gills is grayish-white; foot paler or darker orange, adductors pale orange. The charged outer gills of the gravid female are bright red (like those of *Fusconaja rubiginosa*). Also the gonads are red. Placentae subcylindrical, sometimes very slightly compressed, but only near the base; they are rather solid and can easily be taken out entire, even when glochidia are present.

Glochidia semielliptical, without hooks. Length and height the same, 0.18 mm.

PLEUROBEMA FRIERSONI (B. H. Wright) (See: *Quadrula fr.* Simpson, 1900, p. 787).

A number of specimens of typical *friersoni* were received

from L. S. Frierson, collected August 1, 1912, in Sabine River, Logansport, De Soto Par., La.

Others were sent by H. E. Wheeler from the Ouachita River, Arkadelphia, Clark Co., Ark., collected at various dates. Among them were two gravid females, collected May 19, 1911, one with eggs, the other with unripe glochidia.

The specimens from Ouachita River are not typical *friersoni,* but resemble this species greatly; they are quite variable in shape, but in the average more oblique. Whatever they are, the anatomy of these two forms is identical.

The structure of the soft parts is that of the genus *Pleurobema,* with the outer gills only marsupial. The placentae are lanceolate and compressed. Glochidia not fully mature, but their shape could be made out; they are semielliptical, higher than long, approximate size, length 0.13, height 0.15 mm.

The soft parts seem to have been whitish in all.

This species belongs near to *P. riddelli,* as described by me previously (l. s., p. 262). I first thought they were this species, till Mr. Frierson called my attention to *friersoni,* and I think he is right. Whether the specimens from Jackson, Miss., are actually *riddelli,* remains to be seen.

PLEUROBEMA FASSINANS (Lea) (See: Simpson, 1900, p. 762).

A number of specimens from North Fork Holston River, Saltville, Smyth Co., Va., collected by myself on September 17, 1912.

Anal opening separated from the supraanal by a short mantle-connection, its inner edge with fine papillae. Branchial with larger papillae. Posterior margins of palpi connected for about one-half of their length. Inner lamina of inner gills free from abdominal sac, except at anterior end. In the female (many were examined) only the outer gills are marsupial, having much more crowded septa than the inner gills. No gravid females were found.

In all specimens, the soft parts were grayish-white to pale-brown; in one case, foot and adductor muscles have been marked as orange-brown. None of the shells has been marked as having had red gonads.

The natural affinities of this species remain yet to be investigated. It seems to be a true *Pleurobema,* but represents, in the shell, a peculiar type, which has no closer relation to any of those, of which the soft parts are known.

Elliptio lanceolatus (Lea) (See: *Unio lanc.,* Simpson, 1900, p. 734).

I collected, on June 3, 1912, two specimens, one a gravid female, in Mountain Run, Culpeper, Culpeper Co., Va., and about a dozen, part of them gravid, on June 5, 1912, in Rapidan River, Rapidan, Culpeper Co., Va. All gravid females had eggs, and thus the beginning of the breeding season falls probably in May.

Structure of soft parts identical with that of *E. complanatus,* and chiefly with *E. productus,* agreeing with the latter in the rather long mantle-connection between anal and supra-anal (almost as long as anal). (See: Ortmann, 1812, p. 270.) Structure of marsupium in the gravid female as described in *E. complanatus*; only the outer gills are marsupial, the eggs are whitish, forming rather distinct, lanceolate and compressed placentae.

Unio pictorum (Linnaeus) (See: Ortmann, 1912, p. 274).

In 1911, I have received from W. Israël a number of gravid specimens from Germany. They were collected on May 12, 15, 22, 27, and 28, 1911. Some of those collected on May 22, 27, and 28 had glochidia, and on May 22 some were in the act of discharging.

The investigation of the marsupium shows that the outer gills are only moderately swollen, when charged, and that the edge remains sharp and is not distended. The eggs form lanceolate and compressed placentae, which are not very solid, and when glochidia are developed, there is no or very little cohesion between them; they fall easily apart and pass out of the suprabranchial canals in loose, irregular masses. No traces of lateral water canals have been observed, and the ovisacs remain open below.

The glochidia are of the *Anodonta*-type, as was known

before, being subtriangular in outline, and having hooks. But they are rather small, length and height being about equal, 0.21 mm. This is entirely at variance with the statement of Harms (Zool. Jahrb. Anat., 28, 1909, p. 332) and Haas (Pr. Malacol. Soc. London, 9, 1910), quoted in my text, p. 275, that they are 0.29 mm. long. But possibly this is simply a slip of the pen or a misprint.

Unio tumidus Retzius.

I have gravid specimens, received from W. Israël, collected in Germany on May 22 and 27, 1911. One of the first date had unripe glochidia.

The structure of the soft parts is exactly like that of *U. pictorum*. The glochidia are immature, and the hooks are not yet developed. In general shape they resemble much those of *U. pictorum*, but they seem to be smaller, 0.19 mm.; but this should be confirmed by the measurements of ripe glochidia.

Unio crassus Retzius.

W. Israël sent me gravid females from Germany, collected on May 2, 12, 25, 26, and on June 6 and July 21, 1911. Glochidia were found in specimens collected on May 26 and June 6, on the latter date they were being discharged. In addition, a single gravid female with eggs was collected on December 24, 1910, but this is regarded by W. Israël as an exceptional case. Also the date July 21 appears as somewhat abnormal. The normal breeding season apparently lasts from April to June.

Also here the structure is similar to that of *U. pictorum*. Placentae distinct only, when eggs are present, and not very solid. In the discharging female the glochidia were in the suprabranchial canals in loose, irregular masses. Glochidia of the same shape as in *U. pictorum*, but slightly smaller, and less high in proportion to length; length 0.19-0.20, height 0.18-0.19.

The water canals in the marsupium of the Anodontinae.

Lefevre and Curtis (Bull. Bur. Fisher, 30, 1912, p. 133) regard the lateral or secondary water canals ("respiratory

canals") of the charged marsupium of the *Anodontinae* as a special device for aëration, not of the embryos, as I believe, but of the blood of the gravid female, the mother. Their argument is, that it is hard to see that a canal shut off from the embryos by a membrane could increase the facilities of aëration. I think, this argument rests upon a complete misunderstanding of the requirements and actual conditions; a canal, which permits a circulation of water within the gill, although separated from the embryos by a thin membrane, surely gives a better chance for aëration of the embryos, than the complete absence of such a canal, and, consequently, the complete absence of any water circulation within the marsupial gill. The mass of embryos inside of the water tubes is of such a character, that it would completely choke up the ostia, and there would be only a water current over the outer faces of the gill, separated from the embryos by the whole thickness of the gill-lamina, which is considerable. For this reason, I emphatically must maintain my first opinion, that the lateral water tubes have the function of furnishing breathing water for the embryos and glochidia, and not for the mother.

(*To be continued.*)

A. C. BILLUPS.

Mr. A. C. Billups died early in June at his home in Lawrenceburg, Indiana. He was known to conchologists as an ardent collector of shells, his chief interest being in fresh-water species. Besides his conchological work, Mr. Billups was known as an entomologist, a pursuit in which he took especial delight and satisfaction. In his business as a mechanical engineer, Mr. Billups traveled extensively for a time, installing power plants of various kinds; and this gave many opportunities for collecting in those branches of natural history which interested him. It also gave opportunities for personal intercourse with brother naturalists, many of whom will hear of his death with sincere sorrow. Mr. Billups is survived by his wife and son, Mr. C. F. Billups.

NOTES.

Mr. T. Van Hyning has recently been appointed Librarian of the Experimental Station, and Director of the Museum of the Florida State University; his address is now, Florida State University, Gainesville, Florida.

Modiolus demissus Dillw. and var. granosissimus Sby.—Dr. Dall, in the Trans. Wagner Inst., iii, 796, 797, has pointed out that *Modiola plicatula* Lam. (An. s. Vert., vi, 1819, p. 113) is preceded by *Mytilus demissus* Dillw., Descr. Cat. Rec. Shells, Vol. I, 1817, p. 314, described from Virginia and Carolina. He suggests using the name *demissa* for the southern form with beaded sculpture, and *plicatula* for the northern specimens with smoother ribs. All the examples from the Carolinas loaned to me by Mr. Mazyck were the same as the northern specimens; so, unless the beaded form actually is also found in Carolina, the name *granosissima* Sowerby (Proc. Mal. Soc. London, xi, 1914, p. 9) from Andaras, S. America, and Florida, will have to be used for the Florida beaded variety. *M. plicatula* will then become a synonym of *demissa* Dillw.—E. G. Vanatta.

PUBLICATIONS RECEIVED.

On the Anatomy of Conus tulipa Linn, and Conus Textile Linn. By H. O. N. Shaw (The Quarterly Journal of Microscopical Science, Vol. 60, pt. 1, pp. 1-60, April, 1914). A clear and concise account of the anatomy of these two interesting shells, illustrated by 6 plates and 12 text-figures.

Anatomie des Clausilies Danoises, I, Les Organes Génitaux. Par C. M. Steenberg (Mindeskrift for Japetus Steenstrup, xxix, pp. 1-44, 1914). A well worked-out study, full of interest to workers in the anatomy of land snails.

The Pliocene Mollusca of Great Britain. By F. W. Harmer (Palaeontographical Society, 1913, pt. 1, pp. 1-200,

pl. 1-24, Feb., 1914). This part covers the non-marine species and a portion of the marine Gasteropoda. The author's treatment of Buccinum and allied genera is very interesting. Of *B. undatum* 12 varieties are recognized. To the form which is also found on the eastern coast of North America the varietal name of *littoralis* King (1846) is used. There is apparently an older name for this form—*undulatum* Möller (Kroyer's Tidsskrift, vol. iv, p. 84, 1842) which was adopted by Stimpson. Some sixteen other species of *Buccinum* are described and figured, including a number found living on the Banks of Newfoundland. A new genus *Searlesia* is proposed for the group of which *Trophon costifera* S. V. Wood is the type.[1] The *Chrysodomus dirus* Reeve = *incisus* Gld. = *sitkensis* Midd. of the Pacific coast probably belongs to this genus. *Neptunea decemcostata* Say is considered a variety of *N. despecta* Linné. The author is very conservative, using most of the older generic names, rather than those now adopted by most conchologists. The work is indispensable to one studying the boreal fauna, from the intimate relation of British Pliocene with recent North Atlantic species. The figures are excellent phototypes.—C. W. J.

Land Shells from the Tertiary of Wyoming. By T. D. A. Cockerell. (Bull. Amer. Mus. Nat. Hist., vol. 33, pp. 323-325.) Professor Cockerell's studies in tertiary insects and land shells of the Rocky Mountain region are giving us glimpses of a fauna of surpassing interest. His last paper describes several types new to America. *Protoboysia* is a Pupoid snail with the last whorl running up the spire nearly to the summit; length and width 3½ mm. It differs from the Indian *Boysia* by a peculiar construction of the last whorl. *Boysia sinclairi* and *B. phenacodorum* are forms which "cannot at present be distinguished from *Boysia*." With these species which certainly seem to have Oriental relations, were found a *Vitrea*, a *Thysanophora*, *Pyramidula ralstonensis* and *Oreohelix megarche*. All are from the Clark's Fork Basin.—H. A. P.

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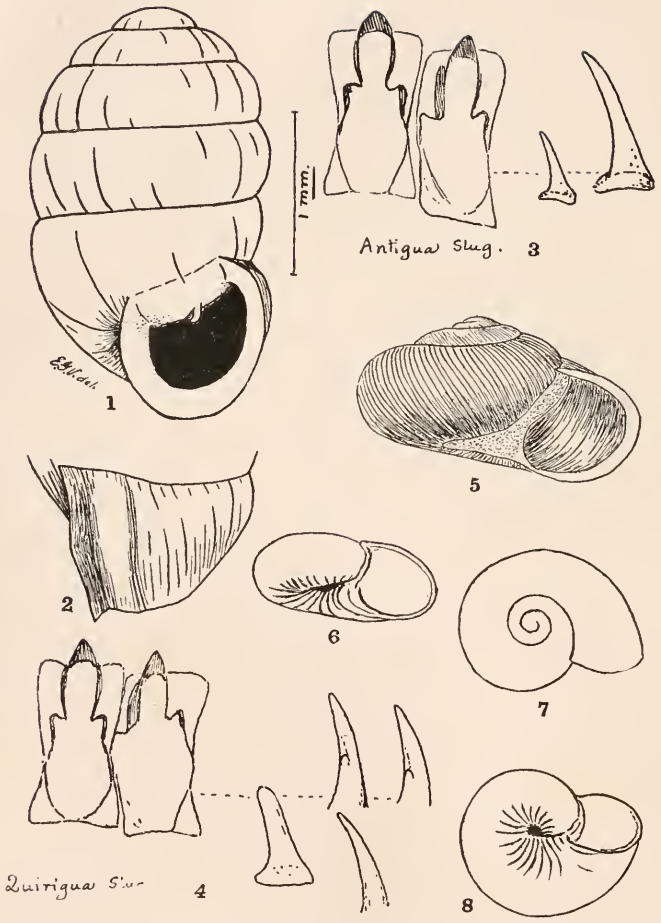
[1] The species of *Searlesia* resembles *Urosalpinx* rather closely. It is remarkable that so large a number (12) should be found in one restricted area.



1, 2. PUPILLA MUSCORUM XEROBIA PILSBRY.
3. AGRIOLIMAX GUATEMALENSIS CROSSE & FISCHER.
4. AGRIOLIMAX G. MOTAGUENSIS COCKERELL.
5. LUCIDELLA TANTILLA PILSBRY, VAR.
6–8. VITRINELLA SHIMERI CLAPP.

The Nautilus.

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SHELLS OF DURAN, NEW MEXICO.

BY H. A. PILSBRY.

When enroute for El Paso, over the Rock Island road, in August, 1910, Mr. L. E. Daniels, and the writer stopped four hours at the station of Duran, Torrance Co., N. M. This place lies about 75 or 80 miles southeast from Albuquerque, at an elevation of 6272 ft., and was selected because it is near the highest point crossed by the C. R. I. & P. road. We had thought it rather a pity to ride through the State without trying out the collecting. After trying Duran we felt reconciled to go on.

The most promising place seemed to be a large, steep, flat-topped butte about a mile south of the station. It proved to be composed of level-bedded white sandstone, the lower slopes stony. We found shells most abundant under large flat stones near the top of the north side. The sides and top are thickly covered with scrubby junipers, some pinyons and a little knee-high scrub-oak. We noted several cacti — Cereus, Echinocactus, Opuntia and Cylindropuntia, and a couple of small ferns; also a small species of Yucca and a filamentous Agave. From the top one sees low ranges and isolated barren buttes.

From about Santa Rosa to Corona the railroad runs through similar sandstone country, modeled by erosion. At Corona, the highest point, the road crosses one of the ranges of sand-

stone hills. Probably the snails we found are a fair sample of the fauna of all this country.

Zonitoides minuscula alachuana (Dall). One specimen.
Vallonia cyclophorella Ancey. Very abundant.
Vallonia gracilicosta Reinh. Much less common.
Pupilla muscorum xerobia Pils. Moderately abundant.
Bifidaria pellucida hordeacella (Pils.). Very abundant.
Bifidaria pilsbryi Sterki. Two specimens.

PUPILLA MUSCORUM XEROBIA n. subsp. Pl. II, figs. 1, 2.

Shell small, very short, composed of 5⅓ whorls, the last three forming the cylindric portion, those above forming a very short, obtuse cone; last whorl ascending a little, having a stout buff crest behind the thin, well-expanded lip. There is a small, short, parietal lamella but no other teeth. Length 2.5, diam. 1.5 mm.

Types no. 104005 A. N. S. P. from Duran, N. M. Others of the same lot in collections of L. E. Daniels and J. H. Ferriss.

Mr. Vanatta looked over the collection of the Academy and reports that he found the same small race from the following localities, all in Colorado. Trinidad, Pilsbry and Ferriss, 1906. Magnolia, Boulder Co., 8000 ft., D. McAndrews. Estes Park, E. H. Ashmun. Black Lake Creek, T. D. A. Cockerell. Near Golden, 7000 ft., E. E. Hand.

The length varies from 2.25 to 2.75 mm. in the lot taken at Duran.

A NEW FOSSIL VITRINELLA, FROM BOSTON, MASSACHUSETTS.

BY WILLIAM F. CLAPP.

Through the kindness of Dr. H. W. Shimer of the Massachusetts Institute of Technology I have been able to examine some of the material he has received from the excavation for the Boylston street subway, Boston, Mass. The results of Dr. Shimer's investigations concerning the marine

fauna which formerly flourished in this region, will appear in a forthcoming publication of the Boston Society of Natural History. I therefore confine myself to the description of a new mollusk which occurs quite plentifully in the material submitted to me, referring those desiring further information regarding its age and the species with which it was found associated, to the publication mentioned above.

VITRINELLA SHIMERI, sp. nov. Pl. II, figs. 6, 7, 8.

Shell small, white, solid, depressed, whorls three, the ultimate rapidly enlarging; smooth above, beneath with about eighteen deeply incised lines radiating from the umbilical region. Suture distinct, umbilicus small, deep, aperture very oblique, circular, not modified by previous whorl, peritreme not continuous, modified to a more or less thin glaze on body whorl, outer lip simple, columellar lip greatly thickened in the direction of and encroaching on the umbilical region. Greatest diameter 1.25 mm., height .5 mm.

It is most readily distinguished from other Vitrinellas, by the radiating lines of the base, caused by the folding back of the thickened inner lip at regular stages of growth. Viewed from above the strongly curved continuation of the outer lip from the suture to the periphery, is more noticeable than in any related species.

The genus Vitrinella has been restricted by Miss Katharine J. Bush (Trans. Conn. Acad. Sci., vol. 10, 1897) to a group of "small more or less hyaline" shells, etc. While *V. shimeri* can not possibly be considered as hyaline it agrees well with all of the other characters of the genus. It is possible that its solid opaque appearance may be the result of the age of the specimens. No species of Vitrinella have been previously recorded from New England.

Associated with *Nassa obsoleta, Mulinia lateralis, Odostomia bisuturalis, Mya arenaria* and *Macoma balthica*. *V. shimeri* belonged to the "between tide" fauna of what were formerly the Charles River flats.

Type: Museum of Comparative Zoology, no. 2600. Paratypes: U. S. National Museum, Boston Society of Natural

History, Mass. Institute of Technology, Academy of Natural Sciences of Philadelphia.

OBSERVATIONS ON THE GENUS SYMPHYNOTA, LEA.

BY L. S. FRIERSON.

In 1819 Rafinesque proposed the genus *Proptera*, and the only described species placed in it by him was the *Unio alata* Say, which has thus been accepted as type of the genus ever since. Evidently unaquainted with Rafinesque's writings at the time, Dr. Lea, ten years afterwards (1829) proposed an almost identical genus, *Symphynota*, and *named as type, the same shell, Unio alatus!* (Obs. vol. 1, page 38). The genus *Symphynota* therefore is a synonym, pure and simple, and Simpson's and other's use of the name, no doubt arose from overlooking the fact that Lea originally took *U. alatus* as type. This being so, those species placed in *Symphynota* by Simpson (Synopsis 1900, pages 662-666) must be placed in the genus *Lasmigona* Rafinesque, 1831. Type *L. costata* Rafinesque (1820).

In the May (1914) NAUTILUS, page 7, I proposed the term *Simpsonaias* for *Hemilastina*. This name has been preoccupied however, and for it I propose the term *Simpsoniconcha,* in honor of Mr. C. T. Simpson.

VOLVIDENS, NEW GENUS.

BY JOHN B. HENDERSON.

I am often puzzled by the generic names applied by authors to many of the small species of Antillean land-shells; as in the case of the Cuban "*Thysanophora*" *tichostoma* Pfr., a fairly common species of the Matanzas and Havana Provinces. So far I have never succeeded in capturing a living specimen of this and therefore cannot seek the aid of an anatomist in deter-

mining its true position with final certainty. Obviously, however, it is not a *Thysanophora*,—nor is it a *Gastrodonta*. It cannot well be a *Sagda*,—nor *Odontosagda*, yet it seems to be closely related to both. Its very prominent character of a centrally placed continuous lamella on the parietal wall I think justifies the creation of a genus to include it within the subfamily *Sagdinæ*. I therefore propose for it the new genus, to be described for the present as follows:

VOLVIDENS, n. g.

Shell small, depressed, widely umbilicate, rather thin and shining and of *Zonites*-like texture. Aperture with an internal sharply raised lamella centrally placed on the parietal wall. Lip simple. Type: *Helix tichostoma* Pfr.

This lamella in fully adult specimens extends back about one-half whorl. Back of this it appears to have been absorbed but there are evidences of its existence from the early whorls. It differs from all the *Proserpinella* group by its lack of an apical callus.

I have not infrequently found in collections among lots of *V. tichostoma* specimens of *Strobilops hubbardi*. To the naked eye the two species appear very much alike, but they can never be confused when examined under a glass. I have seen no mention of the presence of this latter species in Cuba, but I have found it in many localities in Havana and Pinar del Rio Provinces, and it is quite likely it will be found throughout the Antilles. Cuban specimens are smaller than those from Florida, but otherwise identical.

STUDIES IN NAJADES.

BY A. E. ORTMANN.

(*Continued from page 34.*)

Genus: SYMPHYNOTA, subgenus ALASMINOTA nov. subgen.

This new subgenus is proposed for the species: *Margaritana holstonia* Lea as type, which has been placed by Simpson

(1900, p. 670) in the genus *Alasmidonta*. However, the chief character of *Alasmidonta* is in the beak sculpture, which is heavy and generally concentric, at the outmost with only a slight indication of a sinus. And, further, some species of *Alasmidonta* have a tendency to have the inner lamina of the inner gill more or less connected with the abdominal sac (Ortmann, 1912, pp. 279, 280, 294). These are the only essential characters which distinguish this genus from *Symphynota* Lea.

Marg. holstonia has a beak sculpture which is not heavy, consisting of four to six rather fine and sharp bars, the first one or two subconcentric, the following ones sharply double looped, the posterior loop smaller, separated from the anterior by a deep, sharp, re-entering angle. This sculpture is identical with that of *Symphynota compressa, viridis,* and *complanata.* Aud, further, *M. holstonia* has the inner lamina of the inner gills free from the abdominal sac, agreeing also in this with *Symphynota.* Thus it is evident, this species should be placed here.

Symphynota has three subgenera, according to Simpson, but to none of these *holstonia* can be assigned, and thus it is best, to create a new subgenus, *Alasminota,* for it. Its relation to the other subgenera may be made clear by the following table:

Genus *Symphynota* Lea.

a^1 Hermaphroditic. Cardinal and lateral teeth present. Beak sculpture sharply double-looped. Shell subovate or subtrapezoidal, moderately long.
Subgenus: *Symphynota* Simpson.

a^2 Gonochoristic. Cardinal teeth present, laterals rudimentary or absent.

b^1 Shell elongated elliptical, rather small. Surface without sculpture. Beak sculpture sharply double-looped.
Subgenus: *Alasminota* Ortmann.

b^2 Shell subrhomboid, subtrapezoidal, or subovate, moderately long or short, quite large. Surface with more or less developed sculpture of radiating ridges upon the posterior slope.

c^1 Shell large, ovate-rhomboid, high and short. Beak sculpture sharply double-looped. Radial ridges upon posterior slope present or obsolete.

Subgenus: *Pterosygna* Rafinesque.

c^2 Shell rather large, subrhomboidal or subtrapezoidal, moderately long. Beak sculpture coarse, less distinctly double-looped (only sinuated). Radial ridges upon posterior slope well developed.

Subgenus: *Lasmigona* Rafinesque.

SYMPHYNOTA (ALASMINOTA) HOLSTONIA (Lea) (See: *Alasmidonta h.* Simpson, 1900, p. 670).

On September 19, 1912, I collected two males in Clinch River, Tazewell, Tazewell Co., Va., and on September 20, one gravid female, with glochidia, in the same river at Richland, same county.

Anal separated from supraanal by a mantle-connection, which is rather short, shorter than the anal, its inner edge distinctly crenulated. Branchial with papillae. Posterior margins of palpi united for about one-half of their length.

Inner lamina of inner gills free from abdominal sac, except at anterior end. Structure of gills Anodontine: in the gravid female, only the outer gills are marsupial, they have lateral water canals, and their edge is more or less distended. Glochidia of typical shape, subtriangular, with hooks, large, slightly higher than long. Length 0.32, height 0.38 mm.

ANODONTA OREGONENSIS Lea (Simpson, 1900, p. 628).

Twelve specimens, mostly females and gravid, in part with glochidia, have been obtained from T. Kincaid. They were collected in autumn 1911 in ponds near Seattle, King Co., Washington.

Soft parts of the type of the genus *Anodonta*: anal opening small, its inner edge indistinctly crenulated or almost smooth. Supraanal somewhat longer than the anal, widely remote, about twice its own length, from the anal.

Glochidia large, subtriangular, with hooks. Length 0.33-0.34, height 0.32-0.33. The difference between height and length is minimal. These Glochidia agree well with those of

A. cygnea (Linnaeus), except in being slightly smaller (in *cygnea* they are about 0.35 to 0.36 mm.; in *A. grandis* and *cataracta,* the glochidia are still larger, 0.36 x 0.37).

This species is also in shell characters closely allied to the European *A. cygnea.* The soft parts have been previously described by Lea (Obs., 10, 1863, p. 454).

ANODONTA MARGINATA Say. (See Simpson, 1900, p. 632).

One gravid female, collected August 4, 1912, by O. E. Jennings in Six Mile Lake, Silver Islet, Thunder Cape, Canada (North shore of Lake Superior).

The soft parts agree in every respect with those of *A. grandis* and *cataracta.* The specimen had only eggs and no glochidia.

Lea's description of the soft parts of *A. fragilis* (= *marginata*) differs in giving the posterior margins of the palpi united nearly the whole length. In my specimen they are united for about one-fourth on the right side, and for nearly one-half on the left, agreeing also in this respect with *A. grandis.*

THE SUBGENERA OF ALASMIDONTA Say.

Simpson's division into subgenera does not seem to be quite satisfactory, some closely allied species being separated in it. The subgenus *Bullella* is not known in its anatomy, but from shell characters it is very near to the subgenus *Alasmidonta.* The species *A. holstonia* is, as has been shown above, a *Symphynota.* The genus *Pegias* Simpson should fall as a subgenus in this genus. It is further to be remarked, that the subgenera *Pressodonta, Alasmidonta,* and *Pegias* are more closely related to each other than to the two other subgenera.

a^1 Lateral hinge-teeth present, but their number reversed, two in right, one in left valve. Beak sculpture moderately heavy, bars with an angle upon the posterior ridge, and a slight sinus in front of it. Inner lamina of inner gills free. Female shell recognizable by a slight swelling in the region of the posterior ridge.

Subgenus: *Prolasmidonta* nov. subgen.

Type: *A. heterodon* (Lea).

a² Lateral hinge-teeth obsolete or absent. Beak sculpture more or less heavy, with or without a sinus. Inner lamina of inner gills with the tendency to become more or less united to the abdominal sac.

b¹ Posterior ridge of shell indistinct or blunt, posterior slope not distinctly truncated, without corrugations, or only with faint traces of them. Cardinal teeth strongly developed, triangular or squarish, stumpy. Epidermis with unbroken rays.

c¹ Beak sculpture moderately heavy, subconcentric. Shell subrhomboid, posterior ridge moderately developed, blunt, posterior angle of shell little elevated above base line. Female shell distinguishable by a slight swelling of the posterior ridge, accompanied by a radial depression of the posterior slope, causing a shallow emargination of the posterior margin.

Subgenus: *Pressodonta* Simpson.
(Type: *A. calceolus* (Lea)).

c² Beak sculpture very heavy, bars straight or with a slight indication of a sinus in front of the posterior angle.

d¹ Shape of shell regularly ovate, with posterior and moderately elevated above the basal line, and upper and lower margins converging rather uniformly toward it, without a truncation. Posterior ridge indistinct. Male and female shells undistinguishable.

Subgenus: *Alasmidonta* Simpson.
(Type: *A. undulata* (Say)).

d² Shape of shell irregularly subovate, with posterior end greatly elevated above base line, and an oblique truncation below this end. Posterior ridge present. Female shell distinguishable by the stronger development of the posterior ridge and the greater obliquity of the postero-basal truncation, which is slightly emarginate.

Subgenus: *Pegias* Simpson (as genus).
(Type: *A. fabula* (Lea)).

b² Posterior ridge of shell distinct, rounded or rather sharp. Posterior slope more or less truncated, with distinct corrugations. Cardinal teeth weak, compressed, not stumpy, sometimes even obsolete. Epidermis with rays which generally break up into a pattern of spots. Beak sculpture very heavy, bars slightly sinuate. Female shell not distinguishable from that of the male. Subgenus: *Rugifera* Simpson. (Type: *A. marginata* Say).

The position of *A. collina* (Conrad) is yet doubtful. The type-species of *Pressodonta* is unknown in its anatomy, but it is very closely allied to *A. minor,* in fact, the two may be only forms of the same species, so that we may safely assume that they agree in structure.

Alasmidonta (Pressodonta) minor (Lea) (See: Ortmann, 1912, p. 295).

I collected a number of specimens in the North Fork Holston River, Saltville, Smyth Co., Va. (September 17, 1912), and in Clinch River, at Richland and Cedar Bluff, Tazewell Co., Va. (September 20, 1912).

The soft parts of this species were described previously from a single male and a single gravid female. In these, the inner lamina of the inner gills was free from the abdominal sac, except at the anterior end.

From Saltville, I have preserved the soft parts of three males and two gravid females, and they all have the inner lamina of the inner gills entirely connected with the abdominal sac. From Richland I preserved two males and three gravid females: of these, the males have the posterior part of the inner lamina free for about half the length of the abdominal sac, one of the females shows the same condition, but the second has even a larger part of the inner lamina free (about two-thirds), and the third has it almost entirely connected, only a small hole remains open at the posterior end of the foot. From Cedar Bluff I have the soft parts of a gravid female, and here the inner lamina is free for a little more than one-half of the abdominal sac.

Thus, in this species, this character is variable. The fact that those from Holston River have all completely connected inner laminae, and those from the Clinch tend to have it more or less free, may be purely accidental.

All females contained glochidia. The measurements are: length, 0.32; height, 0.27 mm. This is larger than my former measurements (0.31 x 0.25), but a re-examination of the old material shows, that the former values were correct. Thus there seems to be a variation in the size of the glochidia, but the shape is in both cases the same.

NOTES.

Possible transportation of Panopea generosa.—I wish to tell of an instance of the transporting of shells from one locality to another. About a year ago I saw in one of the Los Angeles fish markets four large "Goeducks," (*Panopea generosa*). Not having the shell in my collection I asked about them and found that they were shipped in from Puget Sound and were considered very fine, 50 cents each. I did not purchase and learned a week later that they had finally been sold to some one for fish-bait. Several months later a friend picked up two large valves of *Panopea generosa* on a nearby beach. *Panopea generosa* has been found in this locality but they are smaller than the northern form and very scarce and I am inclined to think that my two valves are from Puget Sound having been thrown from some of the piers by the fishermen, and finally worked upon the beach; at least it is not impossible.—E. P. Chace.

A Large Octopus.—While deep-sea fishing at Long Beach, Cal., Capt. A. H. Mason of the launch Esther C, had a terrific struggle with an octopus measuring 16 feet from tip to tip of tentacles.

Captain Mason brought the octopus to the surface while fishing for rock cod. After the devil-fish had been safely

dumped into the boat Mason attempted to shove it into a box when it fastened several of its tentacles around his shoulder and arm and was attempting to encompass his body when the captain grabbed a gaff hook and killed it.

Mason was the only person aboard the launch at the time. —(*Los Angeles Express,* May 22.)

Mollusca of Maine.—The June Nautilus has an article by N. W. Lermond on additions to the Maine Mollusca. A few slight corrections are needed.

Columbella (*Astyris*) *lunata* Say.

Lowtide at Damariscotta (not dredged), not Sheepscott River, which is ten miles away. Add also as localities: Orrs Island and Quohog Bay, at Casco Bay.

Musculium winkleyi, St. Old Orchard (not Saco).

Amnicola schroekingeri, Saco, proves to be a new species and is now *Amnicola winkleyi,* Pilsbry.

The following are also new to Lermond's list:

Pyramidella (*Syrnola*) *fusca,* Damariscotta at low tide.
Odostomia winkleyi, Quohog Bay.
Odostomia gibbosa, Quohog Bay.

—Henry W. Winkley.

Harper's Ranch, 6 miles above Clifton, Arizona, on the Frisco river, July 1, '14.— * * * We get a rattlesnake (*Crotalus mollossus*) every day. * * *

We find a *Sonorella* here on both sides of the river. In three days got 4 alive, 200 dead. Also an *Ashmunella* (4 dead) that seems to be a beardless *pilsbryi.* Will try the Copper King Mt. one day, and then move up the river four miles.

We have a team, a lumber wagon and a high-school New York boy of 17. We plan to go to Luna and then cross over to the Mongollons and down the Frisco to Duncan on the railroad.—Jas. H. Ferriss.

The Nautilus.

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NOTES ON SOME LAND SHELLS OF EASTERN CUBA.

BY CHARLES T. RAMSDEN.

Recent collections have added two species to the Cuban fauna, one a Haitian *Macroceramus*, the other a tiny *Lucidella*, first described from Florida. A few other new forms are now described, to be illustrated when enough others come to hand to make a plate.

Pleurodonte (Caracolus) sagemon goodrichi n. subsp.

The shell is imperforate, with elevated, dome-shaped spire, the chief height of which is in the penultimate whorl, those above being depressed. Last whorl indistinctly angular in front, becoming rounded. Peristome white, its outer margin rounded, not provided with a point. There are black bands above and below and a faint brown line upon the periphery; ground-color yellow (chamois) except above the upper band, where it is hazel or kaiser brown. Summit and a band above the suture on the spire are whitish. Alt. 21½, diam. 30½ mm.

La subida á "La Hembrita," Monte Toro, Guantánamo, very close to where *Urocoptis* (*Idiostemna*) *pilsbryana* was found.

Named for my friend Mr. Calvin Goodrich, of Toledo, Ohio. This elevated race is obviously different from the high forms figured by Pfeiffer in *Novitates Conchologicæ*, pl. 91, figs. 3 to 6, the latter being acutely keeled.

ANNULARIA EBURNEA PRESTONI, n. subsp.

Very closely related to *eburnea*, but flatter the whorls smaller in caliber; aperture with a broad chestnut band within. Alt. 8.3, diam. 18 mm.

Taken on the "Ojo de Ague" Range between Guantánamo and "Ramón de las Yaguas", nine leagues from the former, and 4 leagues from the latter. I wish to name it for Mr. H. B. Preston of London.

ANNULARIA MAYENSIS Torre & Ramsden, n. sp.

Closely related to *A. interstitialis* from which it differs in sculpture; the larger threads being *more numerous and closer, especially on the last half whorl*, the smaller, interstitial threads are more minute than those of *interstitialis*. The last whorl remains adnate or is only very narrowly free from the preceding at the aperture. Wing of the lip well developed, the peristome well built out in front of it in females, less so in the males. Color very pale brown.

Alt. 11, diam. 15 mm.; 4½ whorls. The males are about 4 mm. smaller in diameter.

"La Ysabelita' de Ramsden, La Maya, Oriente Province, Cuba.

LUCIDELLA TANTILLA (Pilsbry). Pl. 2, fig. 5 (enlarged).

This species was at first thought to be new, but Dr. Pilsbry, on comparing it with his *L. tantilla* (described as a *Helicina*) from Florida, decided that the two were identical. It adds one more Cuban species which has extended its range to the tropical margin of Florida.

The shell is minute, depressed, glossy, light pinkish cinnamon. Sculpture of regular and rather close grooves in the direction of growth-lines. Whorls 3½, moderately convex. Aperture oblique. Outer lip slightly thickened, brown, expanded and a little reflected, retracted slightly at the upper insertion. There is a shallow notch at the junction of the basal lip and the short columella. Axial callus large and thick. Alt. 1.2, diam. 2.1 mm.

Between *La Victoria* and *Nimfitas*, on Monte Toro, Guantánamo, in deep woods; found in dirt at the root of a large tree.

MACROCERAMUS RICHAUDI LINEATISTRIGATUS Pilsbry.

A single perfect specimen of this Haitian shell was taken on the beach at the mouth of a small port 12 miles to the east of Guantánamo harbor, by Oscar Tollin, who was with me on that trip. The name of this port is "Puerto Escondido" which translated means "The Hidden Port." It was used in the old days by the pirates as a haven.

Dr. Pilsbry kindly compared the specimen with the type, and states that it has larger, bolder markings, more whorls, and slightly coarser striation, but there can be no doubt of the identity of the Cuban shell with that of Haiti. It remains to be seen whether this is a drifted specimen, or a real inhabitant of the region, which washed down upon the beach. It measures, length 17, diam. 5½ mm., 13¾ whorls.

UROCOPTIS (*Gongylostoma*) MAYENSIS Torre & Ramsden, n. sp.

The shell is very slenderly fusiform, usually retaining the apex perfect; corneous, somewhat transparent, maculate with opaque white. Surface sculptured with close, fine, but rather weak, strongly oblique striæ, the first 9 whorls smooth, last half of the last whorl pale brown with thread-like striæ on the back. First ten whorls convex, the rest flattened, last half of the last whorl free, tubular, whitish above. Aperture oblique, circular, the peristome reflexed above, elsewhere flaring. Axis encircled with a single thin, obtusely serrate lamella, obsolete in the later whorls, where the axis is extremely slender and somewhat sinuous.

Length 18.5, greatest diam. 2.1 mm.; 22½ whorls.

"La Ysabelita" de Ramsden, La Maya, Oriente Province.

Belongs to the group of *U. wrighti*, but is distinct by its large size and weak sculpture.

RESULTS OF A STATISTICAL STUDY OF VARIATION IN THE BLUE SHELLS OF PECTEN NUCLEUS IRRADIANS FOUND AT ATLANTIC CITY, N. J.

BY HAROLD S. COLTON.

Upon the beach of the Atlantic shore of New Jersey are found dead shells colored blue by clay particles infiltered into the shell. These shells have obviously been buried in the mud or clay of the bottom, out of which they have been washed by the surf.

In collecting shells from along the beach at Atlantic City in 1904, the author fancied that the blue *Lunatia heros* differed in shape from the uncolored ones.

Not having sufficient material with which to base a conclusion, he returned in the Spring to Atlantic City to collect *Lunatia*. Although in January they were abundant, now not a single one could be found. At once it was seen that *Pecten* would be a much more favorable form on which to work, as it was abundant and the ribs of the shell would be easy to count, therefore a few hundred of white and blue ones were collected.

In the course of time the writer happened to mention to Dr. E. F. Phillips, the present chief of the Bureau of Apiculture at Washington, on what material he was working. Dr. Phillips became interested, and in 1905 a joint trip to the coast was made and over five hundred blue right valves of Pecten were collected near Ventnor.

The ribs of these were counted, applying the arbitrary rules of Davenport (1900). The number of ribs of each shell was counted independently and compared. When there was a difference of opinion the ribs were recounted, and no record was made until both agreed.

This study was not completed and therefore not published. While sufficient blue ones were at hand, not enough white ones (representing the form of Pecten now living) were collected for comparison. However, in looking over the results it seemed that it might be of interest to publish them as they

stand and let some one else take up the problem and bring it to a conclusion.

In some places along the Atlantic coast of New Jersey are exposed at low tide stumps of trees and also such turf as is now forming in the meadows behind the line of sand dunes. By this we can infer that the coast line is sinking. This being the case, the dunes are progressing inland, covering up the meadow turf and exposing it again in the ocean beach. Between the dunes and the mainland is oftentimes a bay or a channel. This bay or channel has a muddy bottom as a rule and there the Pecten lives. As the dune line progresses forward the meadow encroaches on the bay, burying the dead shells of the Pecten which are later exposed by the action of the surf and cast on the beach after the dune line has passed over them.

It would be interesting to test if such a theory were correct and note the direction of the evolution of the Pecten or other form during the time that they were buried.

An examination of well borings made in the beach might help throw light upon this point.

Experiments also might be made as to the rate of infiltration of the clay particles into the shell which may be rapid. The author made sections of the shells. These sections show that the clay has penetrated the shell to the center, the pearly layer alone excepted.

With the geologic evidence from well borings, with the experimental evidence from the rate of infiltration of the clay particles and the comparison of the variation of the blue forms with those now living, a conclusion might be drawn as to the direction of evolution in Pecten.

In the table which follows, N = the number of shells the rays of which were counted,—A = the mean,—σ the standard deviation from the mean,—C = the coefficient of variation,—and P. E. the probable errors of the mean, the standard deviation, and the coefficient of variation. These have been computed by the ordinary methods. With them in lower case are placed similar counts made by Davenport (1900) on *Pecten irradians* from several other localities.

Pecten irradians	Ray Frequency 14	15	16	17	18	19	20	21	N	A	P.E.A.	σ	P.E. σ.	C	P.E.C.
Blue Pecten Atlantic City	6	72	187	185	44	5	1	.	500	16.416	$\pm$ .028	.028	$\pm$ .020	5.65	$\pm$ .12
Cold Spring Harbor . .	2	15	108	515	308	90	7	1	1046	17.35	$\pm$ .018	.876	$\pm$ .013	5.049	$\pm$ .074
Cutchogue . .	.	33	95	127	22	4	.	.	281	16.53	$\pm$ .034	.852	$\pm$ .024	5.15	$\pm$ .15
Fire and Oak Islands . .	1	6	15	24	4	.	.	.	50	16.48	$\pm$ .084	.877	$\pm$ .060		

These comparisons show that the average number of ribs of the blue Pecten at Atlantic City is less than the same species at Cold Spring Harbor but about the same as at Fire Island and Cutchogne. That they are more variable than any of these that Davenport reported is also shown by the statistics. To determine the significance of these differences will require much more work.

The author wishes to thank Dr. E. F. Phillips for his share in the work, and also for first introducing him to modern statistical methods.

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SOME SLUGS (AGRIOLIMAX) FROM GUATEMALA.

BY T. D. A. COCKERELL.

When my wife went to Guatemala early in 1912, I begged her to look for slugs, which I supposed would be found in abundance. To her surprise and mine, they proved extremely scarce, the only one obtained being two specimens of *Agriolimax*, of the type of *A. lævis*. These may be described as follows:

(1). From Antigua, a locality in the highlands. Pl. II, fig. 3. About 12 mm. long in alcohol; mantle 5 mm. long, the respiratory orifice 3¼ mm. from its anterior end; color light brownish suffused with slate grey, the mantle dark slate grey; sides below mantle pallid; sole yellowish white; lateral pedal furrow a little above middle of lateral margin of sole; median area of sole a trifle broader than lateral areas, except posteriorly; shell 2½ mm. long, 1¼ broad, narrow, slightly convex, not very thick, the anterior (nuclear) end distinctly emarginate; jaw of the same type as that of *A. lævis*, the median projection very large. Penis sac like that figured for *A. lævis* by Taylor, Monog. L. & F. W. Moll, Brit. Is., part 10, f. 141, with the rounded end curled over, but the whole structure rather more slender, its length a fraction over 2 mm. The lingual membrane of which a beautiful preparation was kindly made for me by Miss Rosamond Patton, shows 31-15-1-15-13 teeth, formed essentially as in *A. lævis* (Taylor, f. 136), except that the central tooth has the mesocone a trifle broader, and the long and slender marginals have no sign of an ectoconal angle. The stomach was full of fragments of leaves, which exhibited cells containing very characteristic crystals, which my colleague Dr. F. Ramaley at once recognized as being exactly like the crystals in leaves of *Begonia*, on which common tropical plant the slug doubtless fed.

(2). From Quirigua, a locality in the tropical lowland jungle. Pl. II, fig. 4. About 10 mm. long in alcohol, of the usual form; mantle 5 mm. long, respiratory orifice 3 mm. from

anterior end; color dark coffee brown, including sole; mantle a shade darker than body; no markings; lateral pedal furrow below middle of sides of sole; median area of sole about as wide as either lateral area. Penis-sac curled like a letter s. Shell 2½ mm. long, a fraction over 1 mm. broad, formed as in the Antigua specimen. Marginal teeth mostly simple, but the inner ones with small side cusps. The stomach contained vegetable remains, including numbers of two-armed hairs, which Dr. Ramaley identifies as being almost certainly those of a leguminous plant.

The character of the penis sac, wholly without any apical branched gland, places both these species in the group of *A. lævis*, and separates them from *A. agrestis*. The jaw also is entirely of the *lævis* type. It is a most extraordinary thing that slugs from the moist tropical coast region of Guatemala, and others from the highlands of that country, apparently native species, should so closely resemble the slug found at high altitudes in the mountains of Colorado, and that common in northern Europe. The fact of the wide distribution of the *lævis* type has long been known, but one remains amazed at such migrations combined with such conservatism!

The same type of slug occurs at high altitudes in Asia. The character of the marginal teeth in the Quirigua slug agrees quite closely with that of *A. tibetanus* Godwin-Austen (Records Indian Museum, II, 1908, p. 414), from an altitude of 14,500 feet. The inner angle of the first laterals (admedians of Godwin-Austen) is less prominent in the Tibet slug, but the drawing is not very detailed. In attempting to distinguish the Guatemalan slugs from veritable *A. lævis*, we are almost at a loss. The total absence of any angle or tooth on the marginals in the Antigua slug appears distinctive, but the far northern *A. lævis hyperboreus* is figured as having just such marginals. The shell in our specimens, except for the narrow form, shows nothing characteristic; it has not the obtusely keeled form of that of *A. berendti* and *A. hemphilli pictus*. The slight differences shown in the figures of the middle and first lateral teeth of the Antigua and Quirigua specimens are apparently of no particular significance, as the

teeth of the different transverse rows are not precisely alike. Both forms, however, show very distinctly the inner angular projection of the first laterals, which is (probably in error?) omitted from Strebel's figures of *A. stenurus* and *A. berendti,* and also from Semper's figure of *A. brasiliensis.* The figures of *stenurus* and *brasiliensis* do indeed show an inner angle, but from its position it is evidently neither an angle or endoconal point. On comparison with *A. guatemalensis* Crosse & Fischer the shell in our slugs is seen to be narrower than the figure in Miss. Sci. Mex. (1878) pl. 9, f. 2; and the lateral teeth have a well-marked endocone, whereas the figure in Miss. Sci. Mex., pl. 9, f. 4, shows none. Much has been made of the inner tooth of the inner laterals, but I suspect that some of the published figures may be faulty, since when the focus is not exactly right it cannot always be seen. Von Ihering's figures of the teeth of *A. brasiliensis* show the inner tooth very well, and differ from Semper's figures of the same species.

It is at present somewhat uncertain whether the Antigua and Quirigua slugs represent different species or subspecies; but since they occupy entirely different life-zones, and present some tangible structural differences, it seems probable that they should be given different names. *A. guatemalensis* is said to be 15-18 mm. long, bluish-black, the mantle darker, the sole pale; central tooth plainly tricuspidate. This might well apply to the Antigua slug, allowing for the usual variation. The teeth of *guatemalensis* were 35-14-1-14-35, which is sufficiently near the formula of the Antigua slug. The locality of *guatemalensis* is Totonicapan, where it was obtained by Bocourt. This, like Antigua, is in the midst of the mountain country, and may be expected to have a similar fauna. All things considered, then, I believe I am justified in calling the Antigua specimen *A. guatemalensis* Crosse & Fischer, 1870. The Quirigua slug, from the tropical lowlands of the Motagua Valley, may for the present be known as *A. guatemalensis motaguensis* n. subsp.

I will take the opportunity to note that Taylor (*op. cit.,* p. 126) is surely in error when he refers my *A. lævis maculatus* to *A. lævis lacustris* (Bonelli). The marginal teeth of

lacustris, as well figured by Lessona and Pollonera, are very unlike those of *A. lævis*, and appear to indicate a distinct species, as the Italian authors maintained.

HENRY HEMPHILL.

We have just received notice of the death, July 25, at Oakland, Cal., of Henry Hemphill, in his eighty-fifth year. Mr. Hemphill was born in Wilmington, Del., in 1830, but for many years had been a resident of the state of California. He was a mason by trade and took great pride in his proficiency. More than fifty years ago he became interested in the shells of the Pacific coast and formed one of a group of enthusiastic collectors which included Kellogg the botanist, Harford, Voy, Stearns and others, of which he was the last survivor. His trade brought him in, at California union wages, such a good income that he could not only lay away a fair nest egg for his old age, but take long vacations. During these periods he visited Florida and all parts of the Pacific coast south of British Columbia, and became one of our most expert collectors of mollusks. The genus of slugs, Hemphillia, was named in his honor by the late W. G. Binney, and a host of species commemorate in like manner his success as a collector.

He published but few papers himself, but was the cause indirectly of much publication by others. He had a keen eye for relationships and differences, and at times mounted on large tablets series of land shells with radiating lines of variation which were most instructive, and which found a place in some of the most important museums. He had been long a widower, and, as age diminished his energies, he retired to Oakland, where for the last few years he made his home with an only daughter. His kindly ways and generosity to others will keep his memory green among those who knew him. He left what is doubtless the best and most complete collection of Pacific coast shells, up to the time of his retirement, that is to be found anywhere except in the National Museum. It is particularly rich in series showing

variation, and in the land shells; also including much valuable exotic material received in exchange. It is to be hoped that this collection may be preserved intact in one of the public institutions of the Pacific coast, as at present a collection of shells worthy of the State of his adoption does not exist in any university or museum west of the Rockies. (Science, August 21, 1914). WM. H. DALL.

PUBLICATIONS RECEIVED.

A DESCRIPTIVE CATALOGUE OF THE NAIADES OR PEARLY FRESH-WATER MUSSELS. By Charles Torrey Simpson. Published by Bryant Walker, Detroit, Mich., pp. xi,1540. Mr. Simpson's *Synopsis of the Naiades*, 1900, next after the *Observations* of Lea, has done more than any other work to stimulate and direct the study of fresh-water mussels. Very little work had been done on our fauna for many years until Simpson's investigation inspired renewed research. The large mass of work which has appeared in the last few years, extending the lines initiated by Simpson, is the best testimonial to the value of his *Synopsis*.

After the *Synopsis* was launched, Mr. Simpson began the more comprehensive work now before us, in which all of the species are described. It was intended that all should be illustrated, but this expectation could not be realized, and on the removal of the author to Florida in 1902, the work was laid aside. Unwilling to see the progress of Naiad study delayed for want of a descriptive work fully developing Simpson's system, Mr. Bryant Walker undertook the publication of this monumental monograph, assisting Mr. Simpson in completing the descriptions of the period from 1902 to January, 1913. The labor and expense of bringing out the book must have been very great, and Mr. Walker has earned the gratitude of conchologists for his part in it.

Mr. Simpson has adhered to the classification of the *Synopsis*, with few changes, in the belief that subsequent work on taxonomy and nomenclature has not yet progressed far enough to warrant such a general revision as will even-

tually become necessary with the progress of science. A few corrections have been made in generic nomenclature. We note that the new name *Cristidens* was misspelled in the heading on p. 1154. The synonymy is given in full, and keys have been made to the species of many genera. The index contains about 7600 entries.

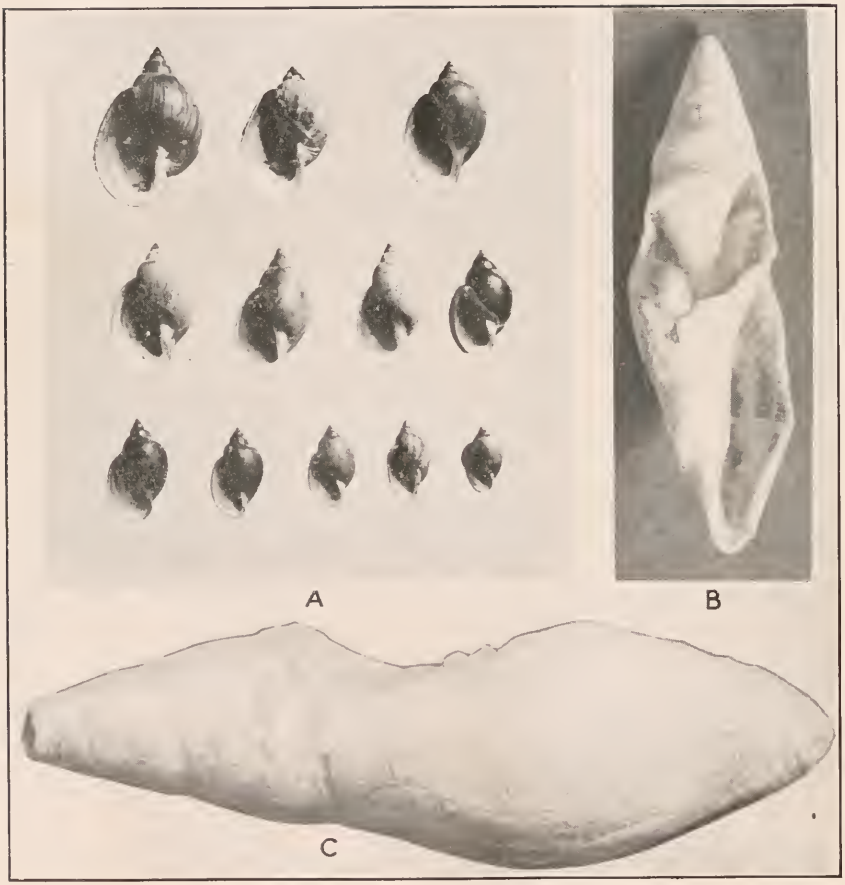
The Descriptive Catalogue gives students access to descriptions of all the species, which otherwise could be had only in a large library, which would take years to accumulate; and it also contains the full exposition of the principles of Simpson's classification which has revolutionized the study of Naiads. It should certainly be in the hands of all interested in fresh-water mussels.

The division of the book into three parts, each with title-page, was an excellent idea, since each makes a volume of about 500 pages.

Illustrations of a Thousand Shells. By Y. Hirase, Kyoto, Japan. Part One of this exceedingly interesting publication has been received. It contains 95 beautifully colored figures, arranged in Japanese style on twenty double folding plates. The coloring and drawings are as a whole remarkably good; many of the more recently described species, such as—*Cyclophorus hirasei* Pils., *Ornithochiton hirasei* Pils., *Chlamys hirasei* Bavay and the rare and beautiful *Pleurotomaria hirasei* Pils. are figured. It forms a unique conchological work.—C. W. J.

NOTE.

In a recent number of the Bulletin du Muséum National d'Histoire Naturelle (1913, p. 476) M. Germain proposes the new subgenus *Pseudoclavator* for *Bulimus favannei* Brug., *Clavator heimburgi* Kob. and *Bul. crassilabris* Gray. He omits *B. procteri* Sowerby, which belongs to the same group, and does not explain why the name *Leucotænius* is not available for the same series of species, *B. favannei* being its type.—H. A. P.



A. PHYSA ACUTA DRAP.
B, C. BATHYTOMA CLARKIANA RIVERS.

The Nautilus.

Vol. XXVIII. OCTOBER, 1914. No. 5

A NEW SPECIES OF LEPTACHATINA.

BY H. A. PILSBRY.

Leptachatina cookei n. sp.

The shell is perforate, ovate-conic, weakly marked with growth-lines, or nearly smooth, and glossy in the best preserved specimens. Apex small, obtuse, the spire straightly conic above, convex below; the last whorl more or less noticeably compressed, more flattened than the penultimate whorl; the base is convex, compressed around the axial crevice. Whorls 6½ slowly enlarging the penultimate somewhat convex, those above nearly flat. The suture is superficial; in the last third of a whorl it ascends slightly and at the aperture it is rather abruptly, arcuately deflexed. The aperture is oblique, ovate, contracted; outer lip obtuse; columellar lip reflected, thickened on the face, and appressed above the narrow perforation, continuous with a callous cord which bounds the rather thick parietal callus, and terminates in an enlargement or tubercle which is separated from the termination of the outer lip by a narrow groove or posterior commissure of the aperture. The columellar lamella is thin, broad and subhorizontal, outwardly emerging to the edge of the columella.

Length 10, diam. 5, aperture 4 mm. 6½ whorls.
Length 9.5, diam. 4. 9 mm.
Length 9.3, diam. 5 mm.
Length 9.2, diam. 4.4 mm.

Oahu: Kawaihapai, on a steep wooded bluff about 500 ft. above the coastal plain, and perhaps ¾ mile from the sea. Type no. 110593 A. N. S. P. Paratype in Bishop Mus.

This is a much larger, more robust species than other forms having a parietal callus and posterior commissure. The columellar lamella is broader and less oblique. By its form and texture it recalls *L. resinula*, which differs in apertural characters.

Kawaihapai is near the western cape of Oahu, and the bluff there is the last terrace of the Waianae mountains. My companions there were Dr. Cooke and Mr. Forbes of the Bishop Museum.

NOTES ON WEST AMERICAN EMARGINULINAE.

BY WM. H. DALL.

The large *Subemarginula yatesii* Dall, 1902, from Monterey Bay, seems to be represented by a fragment from the Bay of Panama. *S. bella* Gabb, described in 1865 is apparently very rare. I have an uneasy feeling that it may prove to be the young of *yatesii*; at all events the point will bear investigation; the specimens at my disposal are insufficient to decide the question. *Zeidora flabellum* Dall, 1895, is only known by the type specimen from deep water off Clarion Island. *Rimula mazatlanica* Carpenter, 1857, is likewise represented only by its type.

Puncturella (*Cranopsis*) *expansa* Dall, 1896, we have from Panama Bay and the Galapagos Islands in deep water.

The typical Puncturellas have the internal septum, below the slit, buttressed by props. *P. noachina* of British seas is the type. But a large number of the species are destitute of this feature. The northern species have thickish tentacles, with the

eyes on protuberances at their outer bases; the antarctic forms have long slender tentacles with the eyes about one third the length from the insertion of the tentacle. Behind the true tentacles is another pair, shorter and without eyes, probably really belonging to the epipodial series of cirri, but separated by a gap from the other shorter ones behind them. These pseudo-tentacles were figured from life by Couthouy and from a spirit specimen by Strebel, and are not represented in the forms of the northern hemisphere. The males in both groups have a well developed verge behind the right tentacle. This of course disposes of the identity claimed on conchological grounds for the antarctic and northern species like *noachina*.

Beginning with those species destitute of props to the septum we have *P. cucullata* Gould, 1849 ; high, with strong ribs, wide interspaces which may be smooth or radially grooved. It ranges from Kadiak Island to La Paz, Mexico. Nearest to this is *P. multistriata* Dall, n. sp. with small, slightly alternated, rather close set radial threads. This has generally been associated with *cucullata* as an extreme variation ; but the very large series I have indicates that it is distinct. It ranges from the Aleutian chain south to San Diego, and the Cortez Bank, Cal.

P. cooperi Carpenter, 1864, has been received from southeastern Alaska and extends to the Santa Barbara Islands, Cal. It is small, erect and very feebly sculptured.

P. caryophylla Dall, n. sp. minute, high, cylindro-conic, with strong, even, radial threads, resembles nothing so much as a miniature solitary coral, and has been dredged off San Diego, Cal., in 40 to 80 fathoms.

P. longifissa Dall, n. sp. is low, narrow, small, with an arcuate back, strong radial threads, very posterior apex, and the slit half as long as the distance from the apex to the anterior margin. It has been found only in 10 fathoms, off Bering Island, Bering Sea.

The Antarctic species are *P. cognata* Gould, 1849, from Orange Harbor, Patagonia, which has been often identified as *P. noachina*, being one of the species with props. *P. falklandica* A. Adams, 1862, is without them, while *P. conica* Orbigny, 1841, has only the faintest traces of a supporting callus. Both

are common to the southern part of Chile, the Magellanic region, and the Falkland Islands.

The largest species of the genus, which reaches 58 mm. long and 28 mm. high, is *P. major* Dall, 1891, ranging from the Pribiloff Islands, Bering Sea, to Boca de Quadra in southern Alaska. It has faint transverse lines of callus but no pits, and the shell is very thin for its size. Lastly *P. galeata* Gould, 1849, has strong pits and props, with a finely threaded, close-set, radial sculpture. It ranges from Unalashka, Aleutian Islands, to the Santa Barbara Islands, California.

A NEW FORM OF BATHYTOMA FROM THE UPPER PLEISTOCENE OF SAN PEDRO, CAL.

BY PROF. J. J. RIVERS.

Plate III, figs. B, C, represent two examples selected from six discovered by Dr. F. C. Clark, who has been for several years an investigator of the coast species of both fossil and recent Mollusca.

Dr. Clark and myself have a partnership in Paleontology, each holding equal rights under the firm name of "Rivers and Clark". Dr. Clark does most of the excavating of strata, while I have the delight to nominate the species when I am able. Our material is great, and unless we can obtain assistance, years will elapse before a complete catalogue will be forthcoming.

Bathytoma clarkiana Rivers. I name this in honor of my colleague, Dr. F. C. Clark of Santa Monica, Cal. The fossil is heavily charged throughout the whole of its structure with carbonate of lime. The columella is thicker than in any described species. If the shell be placed with its aperture downwards, many conchologists would think it an exotic species of *Mitra*. But there are none of the known species of *Bathytoma* that represents this form in its attenuate outline. This figure will explain the oblique condition of the sutures that divide the whorls.

The sculpture has mostly been eroded, but in parts the sculpture remains, resembling that of other members of the genus.

Bathytoma clarkiana if restored, would measure 116 mm, over all, the body whorl measuring 68 mm, the spire 48 mm.

The photos submitted to you have also been sent to the scrutiny of Dr. R. H. Tremper of Ontario, and his reply reads thus;—"The photo is very interesting. I suspect your shell represents some extinct form of Bathytoma. I have not seen a specimen of this genus so long, nor so attenuate. Your fossil is not *B. tremperiana* of Dall. The latter is a very different shell and very much smaller, good-sized specimens measuring 67 mm.; body whorl 82 mm., spire 35 mm., making the body whorl shorter than the spire, while in your specimen the body whorl measures 68 mm., and the spire 48 (if restored)."

STUDIES IN NAJADES.

BY A. E. ORTMANN.

(*Continued from page 47.*)

ALASMIDONTA (PEGIAS) FABULA (Lea) (See: *Pegias f.* Simpson, 1900, p. 661).

Three males and two gravid females (with glochidia) from North Fork Holston River, Saltville, Smyth Co., Va., collected Sept. 17, 1912.

Anal opening separated from the supraanal by a well developed, but rather short mantle-connection. Inner edge of anal crenulated, that of branchial with papillae. Posterior margins of palpi connected for about one third of their length.

Inner lamina of inner gills free in about the posterior half of the length of the abdominal sac, or a little more, so that the connection in front is distinctly longer than usual. Gills of Anodontine structure, in the female only the outer ones are marsupial, have lateral water canals, and are distended at the edge. The glochidia fill the ovisacs in a mass, which

does not form distinct placentae. Glochidia very large, of a specific, peculiar shape. They have the general Anodontine character, and possess the typical hooks, but the anterior and posterior margins are strongly convex, so that the hinge-line is considerably shorter than the length of the glochidium. The general shape thus becomes almost transversely elliptical, with the upper margin straight in the middle, the lower with a slightly projecting point, which bears the hook. Length 0.40, height 0.36 mm.

Color of soft parts whitish, mantle margin with square black spots posteriorly, entirely black on the inside of supraanal and anal.

The structure of the soft parts of this species is truly Anodontine, and does not show any essential differences from that of the genera *Symphynota, Anodonta, Anodontoides*, and *Alasmidonta*. Thus we are to rely only on the shell characters. The most important one, the beak sculpture, clearly places this species with the genus *Alasmidonta*, but the general shape of the shell, chiefly the peculiar truncation at the posterior end and the rather strong sexual dimorphism, give it a rather isolated position. Simpson created the genus *Pegias* for it, relying, as it appears, chiefly on the shape of the shell. But shape of shell is rather variable in the genus *Alasmidonta*, and I think enough justice is done to this, if we regard *Pegias* as a subgenus of *Alasmidonta*. The shape of the glochidia is unique, and although of the common Anodontine type, the triangular outline is changed, in consequence of the great convexity of the anterior and posterior margins, into a transversely elliptical. But since the glochidia also of other species of *Alasmidonta* show differences in shape, also this character is hardly of more than subgeneric value.

In Simpson's diagnosis of the genus *Pegias*, the radial depression in front of the posterior ridge is unduly emphasized: it is very faint, and indicated only in the female. The statement that anal and supraanal are not separated is not correct.

Amygdalonajas donaciformis (Lea) (*Plagiola d.* Simpson, 1900, p. 605).

One male and one gravid female, with glochidia, from Wabash River, New Harmony, Posey Co., Ind., collected by A. A. Hinkley, Aug. 8, 1912.

Soft parts agreeing with those of *A. elegans* (Lea), as described previously (Ortmann, l. c. p. 328). The posterior margins of the palpi are connected for about one-fourth of their length. Inner lamina of inner gills in both specimens connected with abdominal sac, leaving only a small hole open at posterior end of foot. Marsupium of the female formed by 25-30 ovisacs. Glochidia extremely small, subovate, agreeing in shape with those of *A. elegans*, but even a little smaller. Length 0.05, height 0.06 (in *elegans* they are said to be 0.075×0.09 mm.). These are the smallest glochidia known to me.

Proptera capax (Green) (See: *Lampsilis c.* Simpson, 1900, p. 529).

I have males and females of this species from Wabash River, New Harmony, Posey Co., Ind., collected by A. A. Hinkley, Aug. 8, and from the Mississippi River, Martins Landing, Rock Island Co., Ill., collected by Dr. Coker, October 5, 1912.

Coker and Surber (Biol. Bull. 20, 1911, p. 179, pl. 1, f. 4) have first discovered that this species has the glochidia of *Proptera*. Among both of my sets are gravid females with glochidia, and I have been able to confirm this, and to study the rest of the anatomy.

Mantle connection between anal and supraanal rather long, slightly longer than the anal, the latter crenulated; branchial with papillae. In the female, the inner edge of the mantle in front of the branchial is slightly lamellar, with few remote, fine crenulations, which resemble minute papillae posteriorly (near the branchial); but these "papillae" are in proportion to the size of the animal extremely small, much smaller than in the genus *Eurynia*; the lamellar edge is nowhere flap-like, as in *Lampsilis*, and runs forward about one-third

of the mantle margin, passing gradually into the smooth anterior section, of the edge. Posterior margins of the palpi connected for about one-third or one-half of their length.

Inner lamina of inner gills entirely connected with abdominal sac. Marsupium kidney-shaped, consisting of many ovisacs, located in the posterior section of the outer gill. Glochidia celt-shaped, agreeing with the figure given by Coker and Surber. Measurements length 0.09, height 0.18 mm. They are much smaller than those of *P. alata* (0.21 × 0.38), but about as large as those of *P. laevissima* (0.12 × 0.18), but the latter are more dilated at the lower margin.

Soft parts whitish throughout, with the mantle margin brownish-black, more intensely so posteriorly.

Nobody, except Coker and Surber, has doubted hitherto, that this species, according to the shape of the shell, is closely allied to *Lampsilis ovata* and *ventricosa*, in fact, the shape of the shell is very much like that of old females of *L. ventricosa*. Anatomical investigations has shown now, that this is no *Lampsilis* at all. It is a true *Proptera,* and a close examination of the shell reveals, that the resemblance to *L. ventricosa* is indeed only superficial. This is shown first of all in the character of the hinge teeth, of the ligament and the symphynote character of the upper margin, and then by the lack of a distinct differentiation of the male and female shell. In the female, the postbasal region is indeed slightly expanded; but this difference is very indistinct, in fact, I was unable to tell the males from the females, before I had looked at the soft parts: the sexes are even less distinct than in the other species of *Proptera.*

The present specimens show that glochidia are present at the beginning of August and the beginning of October, but they do not give an indication as to the duration of the breeding season.

Genus: Carunculina Simpson, 1898 (as subgenus, Simpson, 1900, p. 563, and Ortmann, 1912, p. 337).

I think now, that *Carunculina* is entitled to generic rank. Characters of the shell (chiefly the beak sculpture), and

characters of the soft parts (the "caruncle" in front of the branchial opening, and the inner lamina of the inner gills, which is more or less free) sufficiently distinguish it from *Eurynia*. In addition, there seems to be a difference, from *Eurynia*, in the glochidia, which are suboval, with the margins rather regularly curved, not much higher than long, and smaller in the two species of *Caruncnlina*, in which they are known. In *Eurynia*, subgenus *Micromya*, the glochidia are larger, distinctly higher than long, and nearly subspatulte, with the anterior and posterior margins nearly straight. In the typical *Eurynia* the glochidia are subovate, but larger and higher in proportion.

I have given (l. c.) *U. parvus* Barnes as type of the subgenus, while Simpson (1900) names *U. texasensis* Lea. However, when Simpson first published the subgenus (as section, in: Baker, Bull. Chicago Ac. Sci. 3, 1898, p. 109, misprinted as *Corunculina*), he used it only for one species, *U. parvus*, and this, consequently, is to be regarded as the type.

(*To be continued.*)

"PHYSA HETEROSTROPHA SAY" IN EUROPE.

BY CAESAR R. BOETTGER.

In the NAUTILUS, Vol. xxvii, No. 10, pp. 112-113, Mr. *Frankenberger* states that all the Physas lately introduced into Central Europe are not the European *Physa acuta Drap.* but the North American *Physa heterostropha Say.* He believes that *Babor* and *Novak* were the first to record this North American shell in the waters of Central Europe. This is not the case. In 1907 *D. Geyer* already mentioned (Jahreshefte des Vereins für Vaterl. Naturkunde in Württemberg, 1907, pp. 426) that it is possible that the ancestor of our form is *Physa heterostropha Say.* It may be that now and then *Physa heterostropha Say* is introduced into Germany with American fishes and plants of aquaristic commerce. But this must be very rare and the ex-

ception. As a matter of fact, however, I have never seen among the many specimens examined any true *Physa heterostropha Say* from a German locality. Even if *Frankenberger* had seen introduced specimens of the American form, he ought not to have generalized this fact. He would not have arrived at such exaggerated conclusions, if he had seen such large series of the introduced German shell as well as such quantities of the Southern and Western European *Physa acuta Drap.* from so many localities as I have been able to study. Had Mr. *Frankenberger* asked me for information,—it would not have been the first time we corresponded,—I should have been glad to give him any desired. This is especially the case with my *Physa acuta thermalis* (Nachrichtsblatt der Deutschen Malakozoologischen Gesellschaft, 1913, p. 161). But this information was even rather superfluous, as I have stated (l. c.), that I had a series showing all intergradations from typical *Physa acuta Drap.* to my new form (Plate III, fig. A.)

This latter shell has reached such a large size by reason of the prevailing favorable conditions. The accompanying figures clearly illustrate this fact. There can be no doubt that all Physas —rare exceptions admitted—found in Central Europe and not belonging to *Physa fontinalis L.* are specimens (and their descendants) of *Physa acuta Drap.* from Southern and Western Europe introduced by aquarists. In many cases it is even still possible to trace their history, as their local forms may often be recognized. Apparently Mr. *Frankenberger* believes every large *Physa* with elongated spire and rough surface to be *Physa heterostropha Say*, quite ignoring the fact that in the natural range of *Physa acuta Drap.* there are also races showing these characters.

NOTES.

NEWSPAPER CONCHOLOGY—The following choice specimen of newspaper science has appeared in several western papers.

"TEST SNAILS SPEED RECORD. TUCSON, ARIZ., Aug. 29.—Prof. Farniss, a naturalist of Joliet, Ill., whose specialty is snails,

has gone into the White Mountains with Frank Cole, a trapper and guide, to study the effect of altitude upon some snails he is taking with him.

"It is well known that snails travel slowly at low altitudes. What their running time is in the more invigorating climate of the mountains will be one of Farniss' problems."

Birds transporting Food Supplies. — Mr. Charles T. Ramsden's interesting note on "The Bobolink as a conveyor of mollusca" suggests to me the desirability of drawing attention to two other instances of similar phenomena. Professor G. E. Beyer of Tulane University, who has been a close student of Louisiana birds for many years, has collected numerous Upland Plover (*Bartramia longicauda*) soon after their arrival upon the Gulf Coast, which bore beneath their wings from 20 to 40 small snails of the genus *Physa*. In reply to a query about this point Professor Beyer in a letter of August 7, 1911 says: The peculiar habit which this bird has in concealing the snails among the under wing feathers has been known to me for many years. When first discovered I pointed out this singular fact to several of my hunter friends. The occurrence, however, was so regular and was confirmed so often in after years, that I expected the habit to be generally known. I used to count the number of snails regularly; at one time I found as many as forty-one, oftener between twenty and thirty, never less than ten or twelve. The stomachs of the birds always contain a number of crushed shells of the snails. Furthermore, the finding of these snails is only possible if the birds are obtained shortly after their arrival from the South, the earliest date of which I always placed about March 22. I was at the time unable to determine whether the species of snail was the same or different from ours, for the genus contains several species. At the time the Papabotte's arrive here, *Physa* is not common with us and does not become plentiful until May and June. I am sorry to say that I became as it were side-tracked in after years as I had intended to continue this

inquiry and extend it to other migratory birds of a similar nature.—W. L. McAtee, Biological Survey, Washington, in *The Auk*, July, 1914, p. 404.

PUBLICATIONS RECEIVED.

The Cephalopoda of the Hawaiian Islands. By S. Stillman Berry. Bull. Bur. of Fisheries, vol. 32, Document no. 789, 1914. A monographic, illustrated account, based chiefly upon material collected by the Fisheries steamer *Albatross*. The fauna contains about 25 named species, together with about half as many uncertain forms. The absence of the great genera *Loligo* and *Sepia* is an unexpected peculiarity. *Sepia* being a littoral group, the author suggests that "wide oceanic areas may in some way form a special barrier to its dispersion. If this be true, we should perhaps expect other littoral forms, such as the *Polypi* [*Octopus*], to be distributed in accordance with the same principle, but this does not appear to be the case. An explanation of this anomaly may be found in the hypothesis that the dissemination of these other forms took place at a more ancient period." The case of *Sepia* seems to be analogous to that of *Fulgur* and other gastropods of our coast which pass the veliger stage in the egg-capsule, and thus have never reached Bermuda, whilst genra with swimming embryos are common to Florida and Bermuda. The presence of *Polypus* in Hawaii indicates, probably, a less isolated condition in former times.

In summing up, Mr. Berry concludes that "although the ensemble of Hawaiian Cephalopods shows many features peculiar to itself, it appears reasonable to regard it as an offshoot, now largely isolated, of the great Indo-Malayan fauna, and therefore impossible of any definite or satisfactory correlation with that of other regions of the north Pacific." The conclusions of students of other groups of animals are quoted, supporting this estimate of the faunal relations of the islands.

FUSCONAIA SELECTA WHEELER.

The Nautilus.

Vol. XXVIII. NOVEMBER, 1914. No. 7

THE UNIONE FAUNA OF CACHE RIVER, WITH DESCRIPTION OF A NEW FUSCONAIA FROM ARKANSAS.

BY H. E. WHEELER.

Conchologists have seldom visited the "Sunken Lands" of Northeastern Arkansas, and little is known of their molluscan fauna. Through these vast flood-plains flow long sluggish "bayous" which for most of the year develop into respectable streams, but in long-continued droughts dwindle to a chain of muddy hollows. Such a river is the Cache. It is formed by the confluence of several small creeks which rise in the swamps of southeastern Missouri and on the western slopes of Crowley's Ridge in the upper part of Clark County, Arkansas. It flows through, or forms the boundary of, eight counties in this state. The only settlement on its banks is a small saw-mill hamlet, and the two nearest towns along its course have less than 500 inhabitants each. For more than one-half of its course of more than one hundred and eighty miles it parallels Black River, then, maintaining a more southerly direction, it continually approaches the easterly bearing course of White River, into which it empties near Clarendon in Monroe County.

Since Crowley's Ridge is the great divide between the St. Francis basin and the Sunken Lands on the east, and the wide valleys of the Cache and other (and more important) rivers on the west, a few notes on its geologic origin and history may be of interest.

Crowley's Ridge extends from southeast Missouri in a some-

what regular curve to Helena, Arkansas, on the Mississippi River, varying in width from less than a mile to more than fifteen miles. Its greatest distance from the Mississippi River is sufficiently indicated by the line between Nettleton and Osceola, approximately forty miles. Near Greenville in Green County the Ridge reaches a maximum elevation of 250 feet above the valley of the Cache, and in many sections there are denuded areas or "ampitheatres" of great extent, but of limited agricultural promise. The lowest beds are clays on which are imposed great deposits of sand and gravel, and the whole capped with loess. The loess is of early Pleistocene age, the gravels are Tertiary, the sands are also Tertiary but of a much older period, while the clays at the base are Eocene as established upon paleo-botanic data. Thrice alternately this region has been depressed and elevated during Tertiary times and before the great depositary and erosive activities of the glacial period began. As Professor Call* truly observes, Crowley's Ridge is "the residual product of long-continued erosion. It is in no sense an upheaval, nor does it, in Arkansas, contain a rock of crystalline character or of Paleozoic age. Its existence is due to the resistance it has offered to erosive forces which have leveled the greater part of the region. It stands now a silent witness to a history so wonderful that the imagination is taxed by any attempt to compass all the details."

The fauna of all the rivers west of Crowley's Ridge and east of the Paleozoic escarpment† in Arkansas possesses a peculiar interest owing to the fact that they are the modern representatives of the ancient Mississippi, which in pre-glacial times did not cut through the solid rock southeast of Cape Girardeau, Missouri, but swept through the lowlands of Black, White and Cache rivers, uniting with the Ohio south of Helena. For the same reason the fauna of St. Francis basin will claim attention as this was the subsequent channel of the Mississippi when it broke through Crowley's Ridge at Chalk Bluff on the Missouri-

* An. Rep. Geol. Surv. Ark., 1889, Vol. II, p. 131.

† This boundary is accurately enough marked for descriptive purposes by the Saint Louis and Iron Mountain Railroad.

Arkansas line, and followed in general the present course of the St. Francis River.*

In the Cache River bottoms occasional forests of cypress are found, though not as frequently as in the swamps east of the Ridge. Generally the lowlands are so flat that, as has been well remarked, "near the North boundary of Clark County it seems to be a matter of indifference to many streams whether they flow into the Cache or into the Black River." The ecologist will find in Harper's "Phyteographical Notes on the Coastal Plain of Arkansas,"† data of much value concerning the vegetation on Crowley's Ridge and the adjacent Prairie regions.

The writer collected a large number of mussels from Cache River at Nemo in Craighead County, on the Bonnerville and Southwestern Railroad, on June 19th, 1914. Since then collecting has been done in Black River and also in the St. Francis. Little and Tyronza rivers on the East of the Ridge, and a comparative study of the forms obtained will be shortly undertaken,

Of the nineteen species listed from the Cache, the *Quadrula*, which is described below, proved to be the most abundant form, though *Crenodonta trapezoides* (Lea) and *Lampsilis hydiana* (Lea) were very common. No univalves were found except *Vivipara contectoides* (W. G. Binn) and *Campeloma lewisii* (Walker). I am indebted to Dr. Bryant Walker for a revision of my identifications.

LIST OF SPECIES.

Lampsilis hydiana (Lea).

Lampsilis fallaciosa (Smith) Simpson.

Eurynia subrostrata (Say). A peculiar form approaching *nasuta*, but only a few females were obtained.

Eurynia lienosa (Con.)? A single young shell, but most probably of this species.

Carunculina parva (Barnes).

Proptera purpurata (Lam.).

Paraptera gracilis (Lea).

Obovaria castanea (Lea).

*See Branner, An. Rep. Geol. Sur. 1889, Vol. II, p. xiv.

†The Plant World, February 1914, Vol. 17, pp. 36-48.

Plagiola elegans (Lea).

Anodonta imbecilis (Say). The species *suborbiculata* which might be expected here was not found. Undoubtedly it will be found in the adjacent swamp ponds.

Anodonta grandis leonensis (Lea).

Anodonta texasensis (Lea).

Arcidens confragosa (Say).

Uniomerus tetralasmus (Say).

Crenodonta perplicata (Con.).

Crenodonta trapezoides (Lea).

Quadrula (*Tritogonia*) *tuberculata* (Bar.).

Quadrula pustulosa (Lea).

FUSCONAIA SELECTA n. sp. Plate IV.

Shell large, solid, quadrate to rhomboidal, much inflated, and inequilateral; dorsal margin evenly curved, gradually curving into the anterior and posterior margins; anterior margin somewhat projecting but regularly rounded; posterior margin obliquely curved, meeting the basal margin in a blunt, rounded point on the base line; basal margin nearly straight, slightly incurved in front of the posterior ridge; umbonal region greatly inflated, flattened in the centre, the greatest diameter of the shell being through the anterior portion; beaks prominent, incurved, their sculpture indeterminate by reason of erosion; posterior ridge strong, roundly angled, extending to posterior point; a shallow medial depression extends from the beaks to the basal emargination, in front of the posterior ridge: the central portion of the disk is decidedly flattened; the posterior area is wide, flattened toward the margin, and markedly incurved from the posterior ridge; surface smooth, with regular and even growth-lines, having the rest-periods clearly defined; epidermis polished and shining in young and half-grown shells, rougher in mature specimens; colored bright reddish-brown, with an undercast of yellow or ochre or occasionally green, becoming with age dull red-brown, deeping to black on the umbonal region; young shells are faintly and beautifully rayed; in young shells the epidermis is "faintly, radiately puckered or festooned, giving an appearance of superficial, radiating striæ" extending from beaks to basal margin, and these are stronger on the dorsal area immediately

behind the posterior ridge; ligament moderately developed, red-brown; hinge strong; interdentum short and flat; in the right valve there is a single, strong, high, triangular and rather smooth pseudocardinal which is ragged apically, and separated from the dorsal margin by a deep, narrow, straight pit for the reception of the anterior pseudocardinal of the left valve and cut away behind to accommodate the posterior pseudocardinal and a long sharp curved lateral; in the left valve the pseudocardinals are low, ragged, and nearly confluent, the anterior one flat, and nearly parallel with the hinge line, the posterior one sharp and triangular, laterals long and somewhat curved; muscle scars deeply impressed, the anterior confluent, the posterior separate; beak cavities deep and capacious; nacre white, sometimes faintly salmon-tinted, irridescent posteriorly.

Length 67.5, height 55.5, diameter 43 mm.

Type locality: Cache River, Nemo, Craighead County, Arkansas.

Type in cabinet of H. E. Wheeler; co-types in collection of Dr. Bryant Walker, Mr. L. S. Frierson, Alabama Museum of Natural History, and Academy of Natural Sciences.

Remarks.—This species is closely related to *Fusconaia undata* (Bar.), but is readily distinguished from it by having the anterior portion of the umbonal area and the posterior ridge almost equally inflated, thus making a remarkably wide and flattened area in the middle of the shell, and by its broad, flattened and incurved posterior area. It further differs from *undata* in not having its narrow, elevated beaks, and in being without the flattened area in front, which is called by Mr. Simpson the "secondary lunule." It is too inflated to be confused with *rubiginosa* (Lea) or with *cerina* (Con.), and too inequilateral, as well as too inflated, to be taken for *hebetata* (Con.), from which it also differs in lacking the peculiar posterior end characteristic of that species.

Dr. Walker points out that young shells of the size of the one figured are rhomboid and only moderately inflated. But with increasing growth the inflation of the umbonal region is rapidly developed, and half-grown specimens are proportionately higher, shorter and more inflated than the adults. An example at this

stage measures: length 43, height 41, diameter 33 mm. At this period the resemblance to typical *undata* is quite striking.

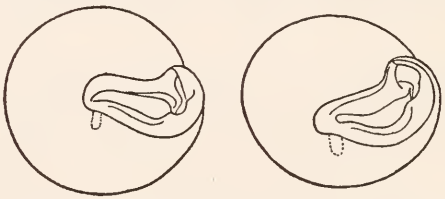
Mr. L. S. Frierson was the first to call my attention to the peculiarities of this species, and both he and Dr. Bryant Walker have generously aided me in its description.

A NEW POLYGYRA OF THE STENOTREMA HIRSUTA GROUP FROM GEORGIA.

BY GEO. H. CLAPP.

POLYGYRA COHUTTENSIS n. sp.

Shell imperforate, thin, reddish-horn color; densely hirsute with very fine, short hairs. Whorls 5, those of the spire convex with a well-impressed suture; the body whorl with the per-



iphery situated high, very convex below, impressed in the umbilical region, abruptly deflected at the aperture and contracted behind the lip. Aperture transverse, narrow, widening anteriorly; parietal tooth large, erect, parallel to the lip in its lower half, then curving outward and in the upper third inward terminating in a *hook* which passes *under the lip* between the notch and the lip tooth, outer end connected with the peristome by a low ridge; outer lip reflected back against the body-whorl but *free its entire length;* lip notch stretched out so that it forms a regular curve in the lip for over half its length with the edge raised from the lip; beyond the notch the lip sweeps around the inner end of the parietal tooth and then forms a small tooth above; fulcrum medium.

Largest shell (type), diam. $7\frac{1}{4}$, alt. 5 mm., smallest 6 x 4, average 7 x 5 mm.

The character of the lip at once differentiates this species

from all others of the group; it is apparently closest to *P. brevipila.*

Collected by Herbert H. Smith on "Fort Mountain and foothills below 1500 feet, Cohutta Mountain, Murry Co., Ga," Aug., 1914.

Type in my collection, cotypes in collections of Academy of Natural Sciences (No. 110919), Geological Survey of Alabama, U. S. National Museum.

DESCRIPTION OF A NEW SPECIES OF TORNATELLIDES.

BY C. MONTAGUE COOKE, PH. D.

TORNATELLIDES PILSBRYI n. sp.

Shell minutely perforate, elongate-conic, corneous, glossy, under a lens minutely striate with growth lines; thin, diaphanous. Spire elongate-conic, with almost straight outlines; apex slightly obtuse. Suture hardly impressed, margined with a broad line. Whorls nearly 7, the embryonic increasing rapidly, convex, minutely, indistinctly, spirally striate, the rest increasing slowly and regularly, nearly flat, the last whorl long, tapering towards the base. Aperture narrow, obliquely truncate-ovate. Parietal lamella large, oblique. Columella narrow below, tumid above, furnished with two well developed, deeply seated lamellæ, of which the lower is the stronger. Peristome thin, erect, the outer margin regularly arcuate. Length 3.1, diam. 1.5, of apert. 1.1, parietal lamella 0.29, umbilicus 0.3 mm.

Oahu: Popouwela, in the Waianae Mts. (Cooke). Type no. 36261 Bishop Museum, cotypes no. 110764 A.N.S. Phila.

All the specimens were collected on the trunks of a species of *Urera*, a foot or two above the ground. It was not abundant at that time, and a later visit to the exact spot did not yield a single specimen. Pilsbry and Spalding were along on the first trip, but apparently neither collected specimens.

This species is characterized by its very strong parietal lamella and the columellar lamellæ, which persist in the adult stage. The columellar lamellæ are rather long, fairly strong and oblique; the upper is situated just below the parietal wall.

The parietal lamella is remarkably strong and extends inward for nearly a whorl.

In an immature specimen with 5½ whorls the parietal lamella is 0.27 mm. in height. The lower columellar lamella is 0.2, the upper 0.14 mm. in height.

NOTES ON RANELLA LAMPAS OF AUTHORS.

BY E. G. VANATTA.

Having gone over the specimens in the collection of the Academy of Natural Sciences, using Mr. E. A. Smith's enlightening article (Journal of Conch., vol. 14, p. 226, 1914), I would like to supplement it by recording my impressions. It seems to me that there are three species involved.

I. Bursa bubo (L.). The first name for any of the shells in question is *Murex rana* [*var.*] *bubo* Linnæus, 1758. Also in Gmelin. *T. bufo* Bolten is a synonym. Var. *gigantea* Smith is a name applied to the extra large size, and var. *lissostoma* Smith for these with a darker-colored aperture.

II. Bursa rubeta (L.). The second species was named by Linnæus *Murex rana* [*var.*] *rubeta.* Also of Gmelin; *T. rubeta* Bolt., *B. rubeta* Smith. *T. tuberosum* Bolt. is a synonym, and has page-priority over *rubeta* if the names were to date from Bolten.

III. Bursa tenuigranosa Smith. (*B. rubeta* var. *tenuigranosa* Sm.). The Academy has a fine specimen 10 inches long, from "India," the gift of M. Thomas. It seems to me to be a distinct species.

A REMARKABLY RICH POCKET OF FOSSIL DRIFT FROM THE PLEISTOCENE

BY T. S. OLDROYD.

In digging away the dirt from a side hill on my place in the Los Cerritos two miles back from the ocean at Long Beach and over 100 feet above sea level, I found some drift in a fissure or pocket in a hard calcareous formation under seven feet of top soil. It consisted mostly of fine sand and broken shells and would measure up about one cubic foot. I call it drift from

the difference in the habitats of the various species when found living : some were common—those usually found at low tide in estuaries or on mud flats ; some from rocky beaches and some usually found in deep water. I found one species, the only specimens I ever obtained living, in a piece of coral brought up from 200 fathoms. The shells, most of them very small, were remarkably well preserved. After sieving and sorting and saving nothing but good specimens, I obtained 105 species and over 4000 specimens, as follows.

Marginella varia Sby., 17
Marginella subtrigona Cpr., 2
Eulima micans Cpr., 21
Drillia hemphilli Stearns, 81
Acteon punctocaelatus Cpr., 16
Acteon traskii Stearns, 2
Platidea anomioides Scacchi, 1
Cadulus nitentior Cpr., 13
Dentalium neohexagonum Pils., 18
Dentalium pseudohexagonum Dall, 125
Caecum californicum Dall, 18
Caecum hemphilli Stearns, 6
Vermetus (tips only), 5
Cylichna alba Brown, 15
Volvula cylindrica Cpr., 15
Tornatina harpa Dall, 3
Tornatina carinata Cpr., 228
Tornatina cerealis Gld., 57
Cyclostremella californica Bartsch, 2
Mangilia angulata Dall, 123
Mangilia variegata Cpr., 17
Epitonium hindsii Cpr., 10
Epitonium bellastriatum Cpr., 2
Epitonium tincta Cpr., 2
Epitonium undetermined, 3
Turbonilla ambusta D. & B., 2
Turbonilla laminata Cpr., 18
Turbonilla torquata Gld., 20
Turbonilla undetermined, 1
Turbonilla undetermined, 1
Olivella pedroana Conr., 662
Olivella biplicata Sby., 3
Olivella intorta Cpr., 15
Crepidula adunca Sby., 135
Crepidula excavata Brod., 12
Crepidula nivea Gld., 6
Crepidula onyx Sby., 3
Crepidula dorsata Brod., 1
Crucibulum spinosum Sby., 11
Siphonaria peltoides Cpr., 1
Megatebennus bimaculatus Dall, 3
Lucapinella callomarginata Cpr., 2
Ischnochiton conspicuus Cpr., 1
Acanthina spirata Blainv., 27
Acanthina engonata aurantia Dall, 3
Tritonalia poulsoni Nutt., 11
Tritonalia foveolata Hds., 1
Tegula viridula ligulata, Mke.,
Calliostoma gemmulatum Cpr., 22

Turbonilla tenuicula Gld., 20
Cerithiopsis pedroana Bartsch, 1
Cerithiopsis cosmia Bartsch, 4
Odostomia tenuis Cpr., 54
Odostomia io D. & B. (?), 10
Turris ophiderma Dall, 5
Melampus olivaceus Cpr., 10
Amphissa versicolor Dall, 2
Columbella carinata Hds., 238
Columbella gausapata Gld., 200
Columbella tuberosa Cpr., 2
Columbella oldroydi Arnold, 18
Columbella oldroydi var., 10
Phasianella compta Gld., 215
Eulithidium substriatum Cpr., 1
Lacuna unifasciata Cpr., 412
Nassa cerritensis Arnold, 8
Nassa mendica Gld., 3
Nassa perpinguis Gld., 148
Nassa fossata Gld., 21
Nassa tegula Reeve, 3
Conus californicus Hds., 22
Polinices recluziana Petit, 52
Thracia curta Conr., 1
Saxicava arctica Linn, 1
Astarte branneri Arnold, 10
Nucula suprastriata Cpr., 413
Corbula luteola Cpr., 77
Calliostoma canaliculatum Mart., 1
Calliostoma tricolor Gabb, 1
Cerithidea californica Hald., 5
Myurella simplex Cpr., 10
Leda taphria Dall, 6
Petricola denticulata Sby., 20
Donax laevigata Desh., 8
Donax californica Conr., 1
Pecten aquisulcatus Cpr., 1
Pecten latiauritus Conr., 3
Pecten monotimeris Conr., 10
Phacoides nuttallii Conr., 6
Tellina meropsis Dall, 1
Mactra falcata Gld., 2
Cardium procerum Sby., 1
Anomia lampe Gray, 5
Ostrea lurida Cpr., 1
Metis alta Conr., 1
Cryptomya californica Conr., 1
Platyodon cancellatus Conr., 1
Chione succincta Val., 1
Chione undatella Sby., 1
Paphia laciniata Cpr., 1
Paphia staminea Conr., 1
Semele decisa Conr., 1
Saxidomus giganteus Desh., 1
Amiantis callosa Conr., 1

THE BOSTON MALACOLOGICAL CLUB.

The Boston Malacological Club has completed successfully its fourth year. It is a hopeful sign that although the first flush of enthusiasm and novelty has passed by, the club still flourishes. The character of the organization is extremely informal.

While the membership includes a number of distinguished professional scientific men, it also includes members who make no pretensions to scientific training, but from one point of view or another, find common ground in their interest in, and love of, shells. In recognition of this varied membership it has been sought to make the meetings of varied character. Some evenings have been devoted chiefly to technical papers; others to a comparative study, exhibition and exchange of shells. The meetings are held monthly from October to April.

Among the important papers given during the year were:— one by Dr. Hervy W. Shimer on the very interesting semi-fossil mollusks from the subway excavation in the Back Bay, Boston, based on the same material from which the Secretary has described a new *Vitrinella*; one by Professor R. T. Jackson on stages of growth in the Mollusca, particularly Nautilus and Hinnites, illustrating the recapitulation theory; one by Dr. P. E. Raymond discussing the probable cause of the peculiar double-looped beak sculpture of the Naiades, which we found to be in the tooth or spur of the glochidial embryo; one by Professor E. S. Morse on the differences between shells from shell mounds and their living local descendants, which differences he found to be very appreciable, and singularly constant in trend not only in New England, but in Japan and (so far as investigated) in Europe.

In June the club held its first field meeting, making an excursion to the varied shores of Cohasset which, if not productive of any novelties, was, at least, well attended, much enjoyed, and the occasion of some interesting observations.— William F. Clapp, *Secretary.*

NOTES.

Mrs. T. S. Oldroyd, of this city, will leave for Oakland tomorrow on the Beaver, having been summoned north to arrange, classify, and pack away, preparatory to their display, more than 1000 shell specimens that are valued at $6,000. This collection was recently bequeathed to the California Academy of Science, San Francisco, by the late Henry Hemphill, who, while alive, was considered the dean of shell collectors.—*Los Angeles Tribune*, Sept. 30.

Note on Antillean Paleogeography.—A recent paper by A. P. Brown and the writer, describing the freshwater shells of the Oligocene of Antigua (Proc. A. N. S. Phil., 1914, p. 309) seems to throw some light upon the little-understood paleogeography of the West Indies. The presence of three species of *Hemisinus* indicates that although a large area of the present Antillean islands was submerged in the Oligocene, there must have been considerable extent of land, since these are river snails, and a number of species would not be likely to have been evolved, or to exist, unless permanent streams existed at least equal to those of the larger Antillean islands. The Oligocene fossil *Ectracheliza truncata* Gabb, from Santo Domingo, further supports this view. This shell is not marine, as Gabb supposed. It is really nothing but a *Hemisinus*, though a very large one, equal to the large South American species. It may be regarded as certain that at the stage of the Oligocene when the Antigua bed was formed, as well as those of Santo Domingo, a considerable land area existed in the eastern Antillean region, and that this land was, or had been, connected with continental South America, the original home of *Hemisinus*. The marine fossiliferous beds of northern Santo Domingo and of Haiti, as well as that of Bowden, Jamaica, were deposited in shallow water near the shore, judging from the character of the fossils.—

H. A. Pilsbry.

PUBLICATIONS RECEIVED.

Littoral Marine Mollusks of Chincoteague Island, Virginia. By John B. Henderson and Paul Bartsch. Proc. U.S.N.M., Vol. 47, pp. 411-421, plates 13, 14. New species are *Epitonium virginicum*, *Turbonilla powhatani*, *T. pocahontasæ*, *T. toyatani*, *T. virginica*, *Odostomia toyatani*, *O. virginica*, *O. pocahontasæ*, *Triphoris pyrrha*, *Diastoma virginica*, *Cerithiopsis virginica*. The large, typical form of *Urosalpinx cinereus* was found, up to 51.5 mm. long. In a protected cove, in which cold springs keep the bottom temperature down to about 8° below that of the open sea, the northern species *Yoldia limatala* and *Nucula proxima* were found. H. A. P.

The Nautilus.

Vol. XXVIII. DECEMBER, 1914. No. 8

TERTIARY FOSSILS ON LONG ISLAND.

BY L. P. GRATACAP.

Myron L. Fuller in his Geology of Long Island (p. 79) writes: "Long Island has never yielded any fossils of Tertiary Age, the diatoms from Rockway and elsewhere described by A. M. Edwards, being from deposits that are clearly interglacial or post-glacial."

Mr. Thomas C. Topping of Bridghampton, Long Island, a highway commissioner, in digging out the side of a bare hill to widen a road, six miles east of the village of Southampton, lately uncovered some fossil shells, which interested him, and were by him given to Mr. William S. Pelletreau, the historian of Southampton.

The shells taken from a light yellow sandy marl, at a depth of eight to ten feet below the surface, were in excellent preservation, and unmistakably of tertiary origin. The locality is three or four miles from the sea, and has an approximate elevation of seventy five feet above high tide water-mark.

The shells were kindly shown to me by Mr. Pelletreau who recognized their interest. They consist entirely of *Arcas*, and number in all twelve separate valves. There are ten valves of *Arca* (*Scapharca*) *transversa* Say and two of *Arca limula* Conrad.

The latter species is significant. It is referred by Dr. Dall to the Miocene of North Carolina, Virginia, Maryland, S. Carolina and New Jersey, and to the Pliocene in Florida, Georgia and S. Carolina. Dr. Dall writes of it (Contributions to the Tertiary Fauna of Florida, 1898); "*Arca limula* is with little doubt the progenitor of *A. ponderosa*, Say, from which it differs by a more quadrate outline and more anterior beaks. The sculpture is usually more elegant." This species does not survive in the recent molluscan faunas.

A. (*Scapharca*) *transversa*, Say, very familiar to-day along the eastern sea-board of the United States, apparently began its life history in the Pliocene, and in the upper beds of that formation, (Dall): attaining its maximum development perhaps in the Pliocene also. The determination of the formally correct reference in time of these fossils, which are unquestionably contemporaneous with each other, is—without more evidence—uncertain. But assuming as fixed the datum point of *A. transversa* as somewhere in the Pliocene, and allowing weight to the probability of *A. limula* finishing its career in the Pliocene, an age not later than that formation may be safely predicated for the shells at Southampton. And the deduction seems legitimate that at that day the climatic conditions along the edges of Long Island were more mild than to-day. It is to be hoped that explorations in this neighborhood will establish more valuable and extended conclusions.

In view of the discussions now pertinaciously continued as to the stability of our coast line, it is, in this connection, interesting to learn that at Southampton, according to the old records (Pelletreau) the ocean has encroached on the land to an extent of the whole width of the beach, and fence-posts formerly set up back of the "beach banks" (sand dunes) are now down to the level of the water at ordinary high-water mark. These dunes ("beach banks") also retreat before the incessant whipping and pressure of the winds, and deserted whaling boats, formerly abandoned behind them, viz., on their northern slopes, have been overwhelmed and have subsequently re-emerged on the south side of the northwardly shifting sand mounds, whose transgression for a time buried them.

NOTES ON MOLLUSKS FROM BRITISH COLUMBIA.

BY A. W. HANHAM.

Puncturella cucullata Gould.

My daughter Phyllis took a full-grown living specimen at low tide this season at Maple Bay, B. C., crawling on the under side of a ledge of rock. Previously I had the species only from Departure Bay, where it was taken rarely by dredging in fairly deep water.

Hemphillia glandulosa Bl. & Binn.

My acquaintance with this species is very limited. I never met with it during several season's careful collecting in the district around Victoria, B. C. Here I have taken it twice—but only in small numbers—by scraping over the dead leaves in small thickets in pastures close to the Corvichan River; in similar surroundings, further back from the river, I could not find any. With it may be taken *Prophysaon hemphilli* Bl. & Binn. (abundant), *Polygyra columbiana* Lea (frequent), and *Polygyra germana* Gould (occasional). In the thickets back from the river our big slug *Ariolimax columbianus* Gld. may be found in some numbers. In my garden, the last two seasons, both this slug and *P. hemphilli* have shown up in great numbers and have done some damage. Another slug—perhaps *Ariolimax niger* Cooper—was noticed on Mt. Arrowsmith, Vancouver Island, at an elevation of 4,500 feet, in 1913 and again this year. It was quite rare, however.

Selenites sportella Gld.

I took a fine *sportella* this summer for the first time, although I have often tried to imagine that some of the smaller *S. vancouverensis* taken were this species. One good specimen and some remains were taken from the cliff a little above high-water

mark on Salt Spring Island towards the end of August, only a few miles from Maple Bay, "as the crow flies." If it had not been the dry season I dare say I might have discovered more or had better success.

Pisidium sp.

Two or three small shells, one living, were found in a very shallow pond, fed by the surrounding snow banks, on Mt. Arrowsmith, Vancouver Island, at an elevation of over 5,000 feet, on August 6th, 1914.

Contents of Wild Duck's Crop and a few other notes. In October my son shot some ducks (Canvas-backs) on Quamichan Lake, which lies a quarter of a mile below, or distant from, our house, and when cleaning them he came and told me that their "crops" appeared to be full of shells. I got him to empty one of them on to a newspaper, and later sorted them out, with the following result:

Lymnæa sp. Several dozen, mostly juvenile, but some half an inch long.

Physa sp. About the same number and size.

Planorbis exacutus Say. Three specimens.

Valvata virens Tryon. Over 200 specimens. The species is greenish and perfectly smooth, and I give this name, as it is the name mentioned by the late Rev. G. W. Taylor in his catalogue of the mollusca of this province, and no other species is listed.

Sphærium or *Pisidium* sp. Two, one fairly large—but both may be *Pisidia*—in about the same quantity as the *Valvata.*

An examination of the crops disclosed absolutely no sign of food of any other kind, and all the crops—there were six birds —appeared to be crammed with shells.

I have found the bivalves fairly abundant in this lake about the roots of the water lilies, but the *Valvata* only rarely, not more than 20 having been taken, so this catch was quite a "find."

Quamichan Lake, B. C. (Vancouver Island).

FRESH WATER SHELLS IN MOOSE RIVER, SOMERSET COUNTY, MAINE.

BY OLOF O. NYLANDER.

Moose River is made up of many lakes and is the main tributary to Moosehead Lake. I have visited this part of Maine twice to make collections of the lower Devonian fossils, and in exploring the lake shores for long distances I have had favorable opportunity to also collect some of the recent shells.

Anodonta marginata Say, Common in Brassua Lake, and Long Pond.

Alasmidonta undulata Say. One living specimen from Brassua Lake and a few dead shells in Long Pond, it seems to be quite rare.

Unio complanatus Sol. Plentiful in the above lakes.

Sphærium sulcatum Lam. One large specimen and many small ones from the South and of Brassua Lake.

Musculium secure Prime. A few dead shells in Misery stream, a tributary to Moose River.

Campeloma decisum Say. Common in Brassua Lake.

Amnicola limosa Say. Common on aquatic plants in the Lakes.

Lymnæa emarginata, var. *mighelsi* W. G. Binney. On the east side of Brassua Lake above the outlet, on a rocky shore a colony of this interesting shell was discovered, a dozen living specimens were collected and about the same number of dead ones. They all compare very well with the large form obtained at Square Lake inlet, some years ago. All of the specimens were the var. *mighelsi*, no young shells were seen, only old and full grown specimens.

Planorbis bicarinatus Say. Common in Brassua Lake, a few in Long Lake, and at Baker Brook Point, Moosehead Lake.

Planorbis companulatus Say. Dead shells were quite common at the south and of Brassua Lake.

By any one having time to work in this part of Maine, I think many interesting things might be found.

CORRESPONDENCE FROM JAPAN AND CHINA.

Tokyo, Japan, *April 23, 1914.*

Dear Dr. Pilsbry: I have intended writing you any time during the past fortnight—but these are busy times and little gets done except what is absolutely necessary. I thought you would be interested in an account of a call I made on Mr. Hirase at his Conchological Museum—

We landed at Nagasaki, ran down to Kagoshima where we inspected the still active volcano of Sakurajima, which erupted so alarmingly in January—We were on the Transport Logan and received wireless reports that thousands were killed. Actually the death toll is said to have been eighteen, for the disturbance began twenty-four hours before reaching its full height and the three or four thousand people living on the island escaped to the mainland.

The scenery on the run down to Kagoshima is really fine—one long gorge surpassing the Rhine in beauty, though not having the historical and legendary associations of that river.

We came back *via* the Inland Sea, stopping at Miyajima, one of the three brag beauty-spots of Japan. I had a fine afternoon on the beaches—getting a lot of stuff that was new to me, and some old friends.

At Kyoto I sent a note to Mr. Hirase, asking if I might call that afternoon, and received a cordial note in return. Mr. Hirase is a dignified Japanese gentleman, nearly of my own age I should judge, full-bearded and fine-looking. After half an hour spent in tea drinking and conversation, Mr. Hirase and his assistant spent a couple of hours in showing me over the collection. They have about ten thousand species and varieties of Mollusks—three thousand Japanese and seven thousand foreign. The collection is beautifully mounted, each specimen or species with Latin names and additional notes and names in Japanese. Being Japanese, the arrangement is artistic, as all things are in this country, and it is a delight to go over it. There has been no economizing of space at the expense of fine appearance, so there is room for few foreign shells besides the Japanese. Mr.

Hirase informs me that several times a year all foreign shells are changed in their cases, so that all of these shells are gone over completely each year, each set being exhibited several weeks.

I scarcely had time to make any specific notes but recall a few striking things. At one place they have various sets of land shells arranged in series to include several recognized species in such a manner as to leave almost no breaks perceptibly demarking specific limits, after a manner with which Mr. Hemphill has made us familiar at home with his *Helix strigosa* group. At another point a case is given up to an exhibition of freaks, each mounted with a perfect specimen of the same species. Among them is a large *Haliotis gigantea* with two full series of holes. Some of the others are even more striking. Among rarities is a splendid series of Pleurotomarias.

Last week I ran down for a couple of days to Misaki to visit the Biological Station connected with the Imperial University. There I met Dr. C. Ishikawa who was down with a class of advanced students for the University vacation and Mr. S. Fujita who has charge regularly. Mr. Fujita has done some work on mollusks but his most important work is the artificial production of marketable pearls—a process which he has but recently perfected. After our return from the Kyoto-Obama trip I hope to run down again and do some careful collecting. A single day on the beaches verified Mr. Fujita's statement that the fauna is very rich.

We are having a truly delightful visit in Japan ; though I never was so helpless,—the language, with no connection to any other that I am familiar with, and offering an entirely new set of roots and word forms, is unbelievably difficult, and I have gotten no hold on it whatever.

On Board S. S. Amping Maru.
October *29, 1914.*

It is some time since I reported, so here goes. We are on our way to Formosa but have a two-day stop off Foochow, China before making the last 24-hour run. Have had a very rapid run through Korea and China, most interesting every-

where, but not very productive of shells. We spent about a week in Korea — half in Seoul and three days in a trip to visit Dr. Borrow, an English lady-physician who is doing a marvellous lot of surgical work in a very primitive hospital in an out-of-the-way place, twenty-six miles from the R. R. On this trip I picked up about two hundred Melanias in a little stream we followed for a mile or two; I also got about thirty species of flowers, although the season is late.

Korea is almost absolutely free of timber, a tradition stating that early Koreans cut it all out to make the country appear barren and to prevent invasion by envious neighbors. It is closely cultivated however wherever it is level enough and the yield is generally good.

The most striking thing to the tourist is the costuming of men and women and the hair dressing of the men. All married men wear the hair in a closely tied topknot projecting about four inches from the vertex. The unmarried men and boys part their hair in the middle and braid it into a long pig-tail. So that we took them all for girls till we learned that no girl or woman is seen without a skirt.

From Seoul we ran through Manchuria to Peking, where we spent a week, doing the ordinary stunts including a two-days run out to Nankow to see the great Wall and the Ming tombs. Then we ran to Hankow by rail where we took boat down the Yang Tse to Nanking where we put in two delightful days as guests of Mrs. Thurston, an old friend of my wife's who is president of a Woman's College, already endowed but yet to be built.

I am astonished at the educational and hospital work being carried by the various missionary boards in the cities of China. There are seventeen separate establishments, churches, chapels, hospitals, and schools and a university under control of the American Episcopal board in the three cities Hankow, Han Yang and Wuchang grouped about the junction of the Han and Yang Tse rivers.

At Nanking around the old examination halls I took about a hundred Helices of three species, and later—on the way to the tomb of the first Ming Emperor I got two or three hundred

Planorbes, thanks to some helpers—men, women and children. When I gave them the enormous sum of twenty cents Mexican —about eight cents—they pretty nearly mobbed me. Mrs. T. said I should have given them four or five coppers and that for months to come every foreigner who went that way would have shells offered to him in the hope of finding another crazy man like me.

At Soochow I met Professor N. Gist Gee of Soochow University who took me out on the canals and lake for a beautiful afternoon's collecting. We saw the river life of the Chinese, the Sampans or house boats in which they are born, live and die; also we saw the fishing with trained cormorants, a queer sight of which I had read. More important we took somewhere from seven to ten species of shells which were everywhere plentiful: *Anodonta*, *Unio*, *Vivipara* (at least three species) a *Bythinia*, *Corbicula* and *Sphærium*. It was most interesting and profitable day.

Very sincerely yours, FRED BAKER.

ON THE RETENTION OF THE ORIGINAL COLOR ORNAMENTATION IN FOSSIL BRACHIOPODS.

BY DARLING K. GREGER.

In 1908 the writer published what he believes to be the first recorded American occurrence of the preservation of the ornamental color design of a Palaeozoic brachiopod.* In this notice the species described, *Cranaena morsii* Greger, came from the Craghead Creek Shales (Middle Devonic) of central Missouri, and at the time, we had in mind the remarkable fact of the preservation of the original color design rather than a suggestion that the markings described were a remnant of the original pigmentation. Our observations, however, since the publication of the article, lead us to believe that in rare instances the original pigment is retained, in a more or less altered condition.

* 1808, Greger, D. K, American Journal of Sci., Vol. 25, pp. 313–314.

In his work on the Middle Devonic of Wisconsin, Dr. H. F. Cleland* figures three species of Brachiopoda, on which the original color design is preserved, viz., *Lingula milwaukeensis* Cleland, Pl. 12, Figs. 3 and 4; Lingula sp. indet, Pl. 12, Fig. 5; and *Craenaena iowensis* Calvin, Pl. 13, Figs. 8 and 9. To this interesting list of occurrences we are able to add three more in which the preserved markings assume a definite pattern and another in which the entire shell is colored and of which we are somewhat dubious.

Greger Coll., No. 35–17. *Lingula* sp., Rowley† from the Grassy Creek Shale (Upper Devonic) of Pike County, Missouri, frequently shows dark blue bands, concentrically arranged, and these we at first attributed to variation in the thickness of the test, but after carefully removing the shell from the matrix, their true character was discovered. The ornamental design of this species is identical with that of *Lingula milwaukeensis* Cleland. That these bands of color are a vestige of the original ornamentation of the species can scarcely be questioned.

Greger Coll., No. 282–5. *Dielasma Calvini*, H. & W., from the upper beds of the Craghead Creek Shale, in two examples, show rays of color, the design being quite similar to the markings shown on *Cranaena iowaensis* Calvin, in Dr. Cleland's figures. In our shells the lines are very faint and at best afford little more than a suggestion of the color design.

Greger Coll., No. 70–10. A specimen of *Orbiculoidea humilis* Hall, from the Hamilton shales of the Canandaigua Lake region of New York, retains the color pattern, which consists of alternating concentric bands of light greenish horn and dark chestnut brown.

Greger Coll., No. 79–12. *Crania modesta*, W. & St. J., from the Cherokee Shale (Pennsylvanian) of Central Missouri, attached to a section of a large Crinoid Column, are dark blue or slate-colored, their host being pearl-gray or nearly white.

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* 1911, Cleland, H. F., Wis. Geol. and Nat. Hist. Surv. Bull., No. 21, Pl. 12, figs. 3, 4, 5; Pl. 13, figs. 8, 9.

† 1908, Rowley, R. R., Mo. Geol. Surv., Vol. 8, 2nd Series, p. 74, Pl. 17, fig. 14.

The finest example of the preservation of color pattern in a fossil Brachiopod that has yet come to the writer's notice, consists of two specimens of *Coenothyris vulgaris* Schl., from the Muschelkalk (Triassic), the design assuming the form of fasciculated rays of bright red, the body color varying from light buff to dull horn. The fresh bright color shown in these shells suggests the retention of original pigment, practically unaltered, during the process of the silization. Greger Coll., No. 351–4.

In conclusion, we would also call attention to *Discinisca lugubris* Conrad, from the Choptank Formation (Miocene) of Maryland. All specimens of this Brachiopod that have passed under the writer's observation are blue-black and on one small example faint concentric bands are present.

NOTES.

Petricola dactylus Sowerby.—In a recent letter from Mr. G. W. Pepper he says: "In all published accounts pertaining to the habits of *Petricola pholadiformis* it is stated that they are 'found living in hard clay.' This seems to be entirely at variance with my collecting in Buzzard's Bay, Mass., where I obtained over 100 specimens from a colony living in sand and gravel in company with the common clam (*Mya arenaria*). In fact I have been unable to find them except associated with the common clam." In writing to Mr. Pepper I obtained some of the specimens, and was pleased to find that they were *P. dactylus*, a much scarcer species on the New England coast than *P. pholadiformis*, and from which it is readily distinguished by its less cylindrical form, due to the wider and more flattened valves. The dividing line between the larger and smaller ribs is less clearly defined. In well-preserved specimens the very young, yellowish shells, described as *Gastranella tumida*, can be distinctly seen on the umbones.—C. W. Johnson.

Lymnæa emarginata mighelsi absent in its Old Localities.—In September I visited Square Lake Inlet, where *L.*

emarginata mighelsi was formerly so abundant, and not a single living or dead shell could be found. The same was true at Cross Lake.—Olof O. Nylander.

Cochlicopa lubrica in Western Pennsylvania.—About the middle of October a friend living in Sewickley, Pa., first noticed a lot of small shells on a flagstone walk at the side of his house. He called me up by telephone and I requested him to get some of the shells, which he did and they proved to be *Cochlicopa lubrica* Müll. On Nov. 30 I visited the place and found the living shells present in *large numbers* as I gathered over 100 from along the edge of the walk in a few minutes. In 25 years collecting in the Sewickley Valley I have found this species decidedly rare so their sudden appearance in the center of the village is very interesting. With the *lubrica* were a number of *Vallonia excentrica* St., which has become very common all through the valley in the past few years. The specimens of *lubrica*, you will note, are a *small* compact form averaging *5 mm* in length.—Geo. H. Clapp.

PUBLICATIONS RECEIVED.

A new Pearly Fresh-water Mussel of the genus Hyria from Brazil. By L. S. Frierson. Proc. U.S.N.M., Vol. 47, p. 363, pl. 12. *Hyria amazonia* n. sp.

List of Mollusca of Harding and Perkins counties. South Dakota Geological Survey, Bull. No. 6. 1914, pp. 95, 96. By Wm. H. Over. In this little-known region, every contribution is of value, giving records from the wide gap between the better known States on the east and west.

The Land and Fresh-water Molluscs of the Dutch West Indian Islands. By Dr. J. H. Vernhout. Notes Leyden Museum, Vol. 36, pp. 177-189. A useful compilation, with a bibliography, and some new records for Curaçao.

The Nautilus.

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FURTHER NOTES ON THE OLIVIDAE.

BY CHARLES W. JOHNSON.

I. ORIENTAL SPECIES.

As one very important work (Chenu's Illustrations Conchyliologiques, Oliva by Duclos) was not available at the time I wrote my previous notes (Nautilus, xxiv, pp. 49-51, 64-68, 121-124) on several species of Oliva, the names of which were affected by adopting the oldest recognizable characterization, it seems well at this time to briefly review the subject. I will therefore give a more complete synonymy of the species, together with some additional notes, hoping thus to show more clearly the changes in nomenclature and the relationship of the species and varieties.

1. Oliva sericea (Bolten).

Porphyria sericea Bolten, Mus. Bolt., p. 33, 1798.
O. textilina Lamarck, Ann. du Mus., xvi, 309, 1810.
Var. *tremulina* Lam., Ann. du Mus., xvi, 310, 1810.
granitella Lam., Ann. du Mus., xvi, 314, 1810.
obtusaria Lam., Anim. sans vert., vii, 436, 1822.
hepatica Lam., (not Marrat) Ann. du Mus., xvi, 320, 1810.
fumosa Marrat, Thes. Conch. iv, pl. 9, f. 119.

Var. *olympiadina* Ducl. (pars) in Chenu's Ill. Conch., pl. 13, f. 11, 12.

Var. *nobilis* Reeve, Conch. Icon., vi, pl. 2, figs 3 a-c, 1850.

Var. *pica* Lam., Ann. du Mus., xvi, 310, 1810.

concinna Marr., Thes. Conch., iv, pl. 7, f. 100, 101.

Var. *tenebrosa* Marr., Thes. Conch., iv, pl. 13, f. 177.

Var. *ponderosa* Duclos, in Chenu's Ill. Conch., pl. 14. f, 8, 9.

Var. *miniacea* Bolten, Mus. Bolt., p. 33, 1798.

miniata Link, Besch. Rostock Samml., pl. 2, p. 95, 1807.

erythrostoma Lam., Ann. Du Mus., xvi, 309, 1810.

magnifica Ducros, Revue critique du genre Oliva, p. 30, pl. 1, f. 4. 1857.

azemula Duclos, in Chenu's Ill. Conch., pl. 15. f. 10, 11, (decorticated)

Var. *porphyritica* Marr. (pars) Thes. Conch., pl. 7, f. 105.

Var. *sylvia* Duclos (pars) in Chenu's Ill. Conch., pl. 14, f. 12.

Var. *marrati* Johns., Naut., vol. xxiv, p. 51, 1910.

1*a*. Subsp. *irisans* Lamarck, Ann. du Mus., xvi, 312, 1810.

Var. *zeilanica* Lam., Anim. sans vert., vii, 436, 1822.

mazaris Ducl. in Chenu's Ill. Conch., pl. 22, f. 7, 8.

Var. *ornata* Marrat, Illus. Conch., iv, pl. 7, f. 102, 103.

cylindrica Marr. (not Sowerby) Thes. Conch. iv, p. 14, f. 193, 594.

lignaria Marr., Illus. Conch., iv, pl. 14, f. 195, 196.

Var. *cryptospira* Ford, Proc. Acad. Nat. Sci. Phila., 1891, p. 99, f. 3, 4.

Var. *fordii* Johnson, Naut., vol. xxiv, pl. 51, 1910.

Both Bolton and Lamarck refer to the same figure in Martini (Conch. Cab., ii, tab. 51, f. 559) which represents the finely marked, indistinctly banded form, with a light cream-yellow aperture. Length 70–85 mm.

Under the Var. *tremulina* is grouped a large series connecting *sericea* with *miniacea*, but typified by having a white or bluish white aperture. It was not figured by Lamarck but all the authors seem to agree—although several intermediate figures are given. The typical form is that figured by Reeve, pl. 4, f. 6c ; Weinkauff, pl. 17, f. 2 ; Marrat, pl. 8, f. 117. *O. fumosa* is only a dark smoky form. The Var. *olympiadina* is restricted to

figures 11 and 12, an albinic form. *Nobilis* represents the large three-banded form, *pica* the brown form with large white subtriangular spots, and *tenebrosa* the almost or entirely brown form. Length 70–100 mm.

The thick, light-colored var. *ponderosa* is intermediate between forms referable to *tremulina* on the one hand and *miniacea* on the other. The latter both Bolten and Lamarck refer to the same figures by Martini (Conch. Cab., ii, tab. 45, figs. 476, 477). I have restricted the *porphyritica* to the small form (45-55 mm.) with bands of bright purple spots, of which I have recently received specimens through Mr. Wm. N. Southern, collected by Mr. Frank E. Rand, at Ponape, Caroline Islands. The name of *sylvia* is applied to the orange-yellow form with a *red aperture*, and *marrati* to the dark brown red-mouthed form as figured by Marrat, (Thes. Conch., pl. 7, f. 109), representing a parallel variation to that of *tenebrosa* and *fordi*.

The subspecies *irisans*, though poorly defined, is the oldest name and has already been applied to various forms of this group by authors. There is only one figure referred to by Lamarck that can be considered as *irisans* (Martini, Conch. Cab. II, Tab. 561); the others are questioned. This figure has not a callous spire and the description "*spire acuminate*" does not apply to the low callous-spired forms, figured by Weinkauff, Marrat and Duclos, but to the form figured by Reeve (Pl. 6, fig. 8b). Figure 8d is the orange-yellow acutely spired *zeilanica* and fig. 8a the low callous-spired *ornata*. The typical *cryptospira* is light yellow with only slight traces of dark marking (Thes. Conch., pl. 9, f. 125) while *fordi* is the dark brown, callous-spired form (Thes. Conch., pl. 9, f. 126). There is also a pure white, callous-spired form (*albescens*).

2. Oliva oliva (Linné).

Voluta oliva Linné, Syst. Nat., 10 ed. p. 729, 1758.

Porphyria vidua Bolten, Mus. Bolt., p. 35, 1798.

Cylindrus nigellus Meuschen, Mus. Gevers., p. 376.

O. maura Lam., Ann. du Mus., xvi. p. 309, 1810.

O. mauritiana (Martini) Marrat (pars) Thes. Conch., iv, pl. 10, 1870.

Var. *fenestrata* Bolten, Mus. Bolt., p. 34, 1798.

fusca Link, Besch. Rostock. Samml., p. 95, 1807.

Var. *fulminans* Lam., Ann. du Mus., xvi, p. 312, 1810.

Var. *sepulturalis* Lam., Ann. du Mus., xvi, p. 311, 1810.

Var. *macleaya* Ducl.; in Chenu's Ill. Conch., pl. 23, f. 13–16.

fabreii Ducros, Revue critique du genre Oliva, p. 43, pl. I, f. 8, 1857.

The species *oliva* Linné cannot be ignored, in the light of our present ruling in nomenclature; while a composite species, the prevailing form is readily recognized as Hanley in his "Shells of Linneus" page 215 says :—"Still it is not unworthy of remark that the *Oliva nigrita* of Karsten (*O. maura* of Sowerby, Genera Shells) has been indicated as the principal variety or form in the 'Museum Ulricae' and that all cited engravings (Argenville alone excepted) of the tenth edition of the 'Systema' wherein the species originally appeared, pertain to that shell". The plain olive-green or yellowish form is *fenestrata*; with broad irregular longitudinal stripes, *fulminans*; with narrow irregular stripes and bands *sepulturalis*; with a light pearl-gray ground color and less conspicuous markings the more pronounced var. *macleaya*.

3. Oliva tigrina (Lamarck).

O. tigrina Lam., Ann. du Mus., xvi, p. 322, 1810 (not Meuschen).

O. holoserica (Martini) Marrat, Thes. Conch., pl. xiii, f. 179, 181.

O. athonia Ducl. in Chenu's Ill. Conch., pl. 5, f. 22, 23 (juv.)

O. stainforthii Reeve, Conch. Icon., vi, pl. 19, f. 40 (juv.)

Var. *fallax* Johnson, Nautilus, xxiv, 65, 1910.

The dark brown form resembling *O. oliva* is the var. *fallax*, representing the color variation common to many species.

4. Oliva funebralis (Lamarck).

O. funebralis Lam., Ann. du Mus., xvi, p. 332, 1810.

O. labradorensis (Bolten) Marr., Thes. Conch., pl. xi, f. 146–148.

O. leucostoma Ducl. in Chenu's Ill. Conch., pl. 29, f. 14–16.

O. propinqua Marr., Thes. Conch., pl. xi, f. 141–142.

O. avelana (Lam.) Marr. Thes. Conch., pl. xi, f. 149–150.

O. glandiformis Marr. (not Lam.) *pars*, Thes. Conch., pl. xii, f. 174, 175.

O. guliola Ducl., in Chenu's Ill. Conch., pl. 30, f. 5, 6.

An extremely variable species, the limits of which are very difficult to define. The figure cited by Bolten is unrecognizable. *O. avelana* as figured by Marrat probably represents faded examples, of which I have seen similar colored specimens. Under *glandiformis* Marrat figures at least two species ; figure 173 is a form of *elegans*, the others probably variations of this species. The figure referred to by Lamarck as *glandiformis* can not be identified.

5. Oliva bulbosa (Bolten).

Porphyria bulbosa Bolt., Mus. Bolt., p. 34, 1798.

Oliva undulata Lam., Ann. du Mus., xvi, p. 318, 1810.

Voluta ventricosa Dillw., Cat. Recent Shells, i, 515, 1817.

Var. *inflata* Lam., Ann. du Mus., xvi, 319, 1910.

picta Reeve, Conch. Icon. Oliva, sp. 79, pl. 26, f. 79 (juv.)

ovum-ralli Ford, Proc. Acad. Nat. Sci. Phila., 1889, p. 139. (decorticated).

Var. *tuberosa* Bolt., Mus. Bolt., p. 37, 1798.

bicingulata Lam., Ann. du Mus., xvi, p. 319, 1810.

bicincta Marr., Thes. Conch., iv, pl. xiii, f. 189.

Var. *fabagina* Lam., Ann. du Mus., xvi, p. 325, 1810.

crassa (Martini) Marrat, Thes. Conch., iv, pl. xiii, f. 186,

The typical form has undulating longitudinal stripes, both Bolten and Lamarck referring to the same figures (Conch. Cab. ii, Tab. 47, f. 507, 508). Var. *inflata* has only small bluish-gray spots and *bicingulata* two dark brown bands. Var. *fabagina* is irregularly clouded with dark brown. Pure white examples constitute the var. *alba*.

6. Oliva variegata (Bolten)

Porphyria variegata Bolt., Mus. Bolt., p. 33, 1798.

O. evania Ducl. in Chenu's Ill. Conch., pl. 22, f. 3, 4.

O. zebra Kuster, Conch. Cab., Oliva, Tab. 5, 6, 1878.

Var. *reticulata* (Bolten).

Porphyria reticulata Bolt., Mus. Bolt., p. 33, 1798.

O. sanguinolenta Lam., Ann. du Mus., xvi, 316, 1810.

The grayish-white reticulated form is typical. The dark olive-green, finely reticulated form is the var. *reticulata.* In the latter case both Bolten and Lamarck refer to the same figures (Martini, Conch. Cab. ii, Tab. 48, f. 512, 513).

7. Oliva tricolor Lamarck.

O. tricolor Lam., Ann. du Mus., 316, 1810.

O. guttula (Martini) Marr., Thes. Conch., iv, pl. xii, f. 165–168.

var. *philantha* Ducl., in Chenu's Ill. Conch., ii, pl. 22, f. 5, 6.

This species is more closely related to *variegata* than to *elegans.* The var. *philantha* is the light-colored form often approaching *O. caerulea* in external appearance.

8. Oliva cærulea (Bolten).

Porphyria caerulea Bolt., Mus. Bolt., xvi, p. 313, 1810.

O. episcopalis Lam., Ann. du Mus., xvi, p. 313, 1810.

Var. *lugubris* Lam., Ann. du Mus., xvi, 317, 1810.

The var. *lugubris* is based on the small form heavily clouded with brown, as figured by Duclos, (Chenu's Ill. Conch., ii, pl. xi, f. 5, 6.) also by Marrat (Thes. Conch. iv, pl. 4. f. 48). It was not figured by Lamarck.

9. Oliva ispidula (Linné)

Voluta ispidula Linné, Syst. Nat., 10 ed. p. 730, 1758.

O. hispidula Ducl. in Chenu's Ill. Conch., Oliva p. 14, *ispidula* pl. 8.

O. tigridella Ducl. in Chenu's Ill. Conch., pl. 9, f. 13, 14.

Var. *stellata* Ducl. Chenu's Ill. Conch., pl. 8, f. 11, 12.

Var. *taeniata* Link, Besch. Rostock Samml., pl. 2, p. 98, 1807.

Var. *flaveola* Ducl., Chenu's Ill. Conch., pl. 7, f. 17–20.

Var. *candida* Lam., Ann. du Mus., xvi, p. 322.

This extremely variable species, most readily distinguished

by its brown aperture, has several well marked varieties. Var. *stellata* is white with coarse brown markings and low spire, *taeniata* white with a broad subsutural band,—*flavcola* is yellow with a white aperture and *candida* is an albino form. Specimens from Sarmar, Philippines, collected by Mr. E. L. Moseley, are all uniform in color, representing the dark reticulated form (Thes. Conch., fig. 248). This might bear the varietal name of *samarensis*.

10. Oliva annulata (Gmelin).

Voluta annulata Gmel., Syst. Nat., p. 3441, 1790.
O. leucophaea Lam. Ann. du Mus., xvi. p. 314, 1810.
Var. *amethystina* Bolten., Mus. Bolt., p. 35, 1798.
aurata Link, Besch. Rostock. Samml., pl. 2, p. 97, 1807.
guttata Lam., Ann. du Mus., xvi, p. 315, 1810.
cruenta (Solander) Dillw., Cat. Recent Shells, i, 514, 1817.
maculata Ducl. in Chenu's Ill. Conch., pl. 16, f. 1–5.
Var. *mantichora* Ducl., Chenu's Ill. Conch., pl. 16, f. 7, 8.
emicator Marrat. (Pars), Thes. Conch., pl. 5, f. 57, 60.

It seems unfortunate that the pale abnormal form should have to be the type of the species, instead of the beautiful *amethystina*. To the latter both Bolten and Lamarck refer to the same figures by Martini (Conch. Cab. ii, Tab. 46, f. 491, 492). Many specimens of the var. *mantichora* show the same malformation of the typical form—an elevated ridge at the periphery.

11. Agaronia gibbosa (Born).

Voluta gibbosa Born, Test. Mus. Caes., p. 215, 1780.
Voluta utriculus Gmelin, Syst. Nat., p. 3441, 1790.
Oliva gibbosa Marrat, Thes. Conch. iv, pl. 19, f. 307 (pars).
Oliva (*Agaronia*) *gibbosa* Tryon, Manual Conch., v, 90, f. 85–87, 1883.

The dark brown specimens are usually decorticated. The orange-yellow form might bear the varietal name of *A. g. aurantia*, n. var.

12. Olivancillaria urceus (Bolten).

Porphyria urceus Bolt., Mus Bolt., p. 37, 1798.
Oliva brasilana Lam., Ann. du Mus., xvi, 322, 1810.

Voluta pinguis Dillw., Cat. Recent Shells, i, 516, 1817.

Oliva (*Olivancillaria*) *brasiliana* Tryon, Manual Conch., v, 90, pl. 36, f. 88.

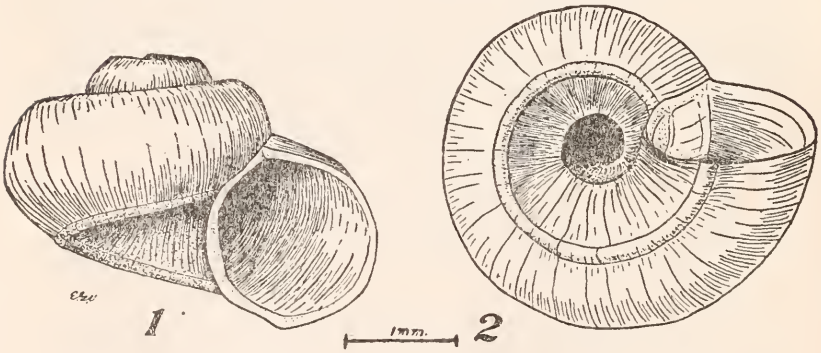
TWO NEW VARIETIES OF VALVATA.

BY E. G. VANATTA.

VALVATA TRICARINATA INFRACARINATA n. var. fig. 1, 2.

Shell globose, depressed, translucent, early whorls orange colored, body-whorl greenish gray, spire moderately elevated, apex obtruse, suture linear, whorls 3¼, rapidly increasing, last whorl flattened above, with an impressed line near the suture, slightly angular at the shoulder, periphery rounded, surface polished, provided with irregular growth lines. Umbilicus wide, deep, funnel-shaped, surrounded by a strong carina. Aperture oblique, orbicular, slightly angular at the suture and base, parietal wall short, lip thin.

Alt. 2.53 diam. 3.48 apert. alt. 1.74 diam. 1.55 mm.



Type in the collection of the Academy of Natural Sciences number 12087 from White Pond, New Jersey, collected by Dr. H. A. Pilsbry and Mr. S. N. Rhoads in 1895. Also in the collection from Hamilton, Ontario (Robert Walton); Mohawk, New York (Dr. James Lewis); Post Pliocene at Halcyon Lake,

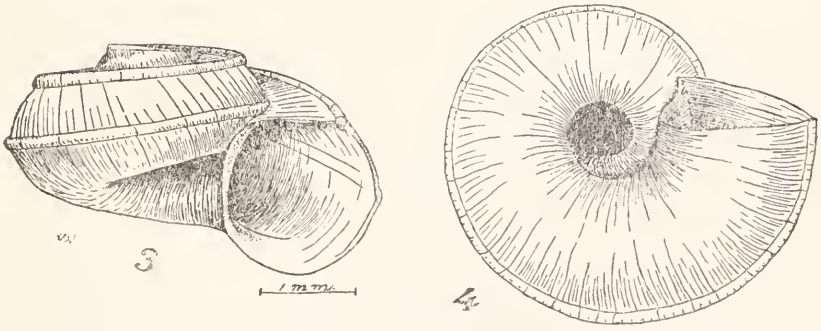
Duchess Co., New York (W. S. Teator); Post Pliocene at White Pond, New Jersey (Dr Joseph Leidy); and Saginaw Bay, Michigan (Prof. M. Miles.)

Differs from *V. t. simplex* Gld by having a basal carina and from *V. t. confusa* Wkr. by lacking a keel at the shoulder.

VALVATA TRICARINATA BASALIS n. var. figs. 3, 4.

Shell discoidal, thin, translucent, greyish corneous, spire truncate, slightly elevated, apex impressed, suture linear, shallow. Whorls $3\frac{1}{4}$, the first ones with a median carina, body-whorl slightly descending at the aperture, with two strong carinæ, the upper surface between the suture and the shoulder keel flat, slightly convex between this and the peripheral carina, base evenly rounded to the rather large deep umbilicus, surface rather dull, sculptured with irregular growth striæ. Aperture irregularly truncate orbicular, lip thin, angular at the suture, upper carina and peripheral keel ; base and columella evenly arcuate, upper lip straight.

Alt. 2.56 diam. 4.15, apert. alt. 1.69, diam. 1.74 mm.



Type in the collection of the Academy of Natural Sciences number 11995 from the Hudson River, New York (W. M. Gabb). Also in the collection from Vermont (J. S. Phillips).

Differs from *V. tricarinata* Say by lacking the basal carina, and from *V. t. confusa* Wkr. by the absence of a basal keel and in having a peripheral carina.

LAND SHELLS FROM VARADERO (CARDENAS) CUBA.

BY JOHN B. HENDERSON.

Varadero is a little settlement of winter cottages planted in the sands of a long narrow peninsula that encloses the Bay of Cardenas. There is a core of pleistocene coral rock more or less densely covered with scrub growth with many cacti as a feature. Besides this there is only the beach sand on the one side and mangrove swamps on the other making altogether a most uninviting field for land-shelling. The following list represents only a few hours collecting but is probably almost a complete census of the region.

Oleacina solidula Pfr.
" subulata Pfr.
Obeliscus homalogyra Shuttl
Varicella (Pich.) gracillima Pfr.
Thysanophora selenina Gould
" boothiana Pfr.
Volvidens tichostoma Pfr.
Cepolis cubensis penicillata
Urocoptis poeyana variegata Pfr.
" garceana Presas (var)
Macroceramus gundlachi Pfr.
Microceramus gossei Pfr.
" denticulatus Gundl.
Cerion sagraianum Pfr.
" " hologlyptum Pils.
Liguus fasciatus Mull.
Guppya gundlachi Pfr.
Pupoides marginatas Say
Bifidaria sp.
Chondropoma pictum Pfr.
" dentatum Say
Alcadia hispida Pfr.
Eutrochatella rupestris Pfr.

STUDIES IN NAJADES.

BY DR. A. E. ORTMANN.

Lastena lata (Rafinesque).

Simpson, Pr. U. S. Mus. 22. 1900 p. 654.—Descr. Cat. 1914 p. 453.

I have collected a number of specimens in Clinch River, at Cleveland, Russel Co., Va., and at St. Paul, Wise Co., Va., among them three gravid females (May 13 and 14, 1913), one

of which (May 13) had glochidia, the others eggs. Additional specimens, the females not charged, were found on Sept. 7 and 8, 1914 in Clinch River at Clinton and Edgemoor, Anderson Co., Tenn.

This shell has been taken by Simpson (l. c.) for a form allied to *Anodonta*, and I have accepted this view, and have treated the genus *Lastena* with the subfamily *Anodontinæ* (Ann. Carnegie Mus. S. 1912 p. 297); but in the description (p. 298) of the soft parts of the sterile female, I have called attention to the fact, that typical Anodontine characters have *not* been observed in the marsupial gills: there were no traces of lateral water tubes, and no thickened tissue at the edge.

The present specimens show conclusively that *Lastena* does not belong to the *Anodontinæ*, but that it is a member of the subfamily *Unioninæ*. Also the fact that in May females with eggs were found, indicates that this is a tachytictic form (summer breeder), and not a bradytictic, as the *Anodontinæ* are.

My previous description, as far as it concerns the anal and supraanal openings, the branchial opening, the palpi and general features of the gills, is confirmed by the present material. To this, however, should be added the *peculiar shape of the foot*, described by Simpson as: "very large . . . . . club shaped, capable of great extension". This is a very important character of the genus, and is found in no other North American Naiad, and in this feature *Lastena* can be compared only with the South American *Mycetopoda*, which, however, belongs to an entirely different family. When contracted, the foot does not show its remarkable features; but in life, when extended, it is extremely elongated, at least as long as the shell, of subcylindrical, somewhat compressed shape, with a distal swelling. Apparently, the foot serves as a permanent anchor, and is not withdrawn into the shell under ordinary circumstances, even when the shell is closed, and hence the closed shell is *gaping* at the anterior end.

The marsupium of *Lastena lata* is restricted to the outer gills, and not the whole outer gill is marsupial, but only the middle portion of it, about one half of the length of the gill. The anterior and posterior sections remain non-marsupial. The

charged part is moderately swollen, with the edge remaining sharp. The ova or glochidia form lanceolate, moderately developed placentæ. Glochidia almost semicircular, slightly oblique, inequivalve, with one one end somewhat narrower, the other somewhat wider. They are distinctly longer than high. Length 0.19; height 0.15 mm. The lower margin is uniformly and broadly rounded, and there is no trace of a point or a hook.

Color of soft parts (in life) pale, as described previously; placentæ whitish.

Lastena belongs to the subfamily *Unioninae* of the family *Unionidae*, and is most closely allied to *Elliptio*. This is also supported by the shape of the shell and the beak sculpture. However, *Lastena* differs from *Elliptio* (and from all other genera of the *Unioninae*) by several important characters, which are unique, and would possibly entitle it to the rank of a subfamily, in case the *Unioninae* should be elevated to a family. In the shell, the most prominent feature is the reduction of the hinge, a case very rarely observed in the *Unioninae* (the only other one known to me is *Gonidea*). In the soft parts, the structure is like *Elliptio*, but the restriction of the marsupium to the middle part of the other gills is peculiar, and so is the extreme development of the foot. Also the glochidia, although of the general Unionine type, are unusual on account of their obliquity.

Lastena represents a unique specialization of the *Elliptio*-type, and is a very good genus, which, in the systematic arrangement, should follow *Elliptio* and *Uniomerus*.

PUBLICATIONS RECEIVED.

Bulletins of American Paleontology, No. 24. New and interesting Neocene fossils from the Atlantic Coastal Plain, by Axel Olsson. Numerous new species from the Miocene of Virginia to Florida are described. The blue clay marls of the lower James river valley are considered to belong to the Yorktown formation, and not, as some geologists have stated, to the Calvert.

The Nautilus.

Vol. XXVIII. FEBRUARY, 1915. No. 10

OUR NEW MEXICAN EXPEDITION OF 1914.

BY JAS. H. FERRISS.

The *Ashmunella* territory, so far known, lies in the southwestern corner of New Mexico and the south-eastern corner of Arizona. A line drawn south-westerly from Sante Fe, N. M., 500 miles to Nogales, Arizona, will mark the northwestern side. A line starting 125 miles eastward of Santa Fe, in San Miguel county N. M., running parallel with the former line to the Organ Mountains in Donna Anna county will mark the southeastern boundary. Southward the genus is not known below the Mexican line. There is much territory near at hand that remains unexplored.

Following the scouting expedition of 1913 a second scouting expedition, assisted by Mr. L. E. Daniels was made into this territory in the summer of 1914. In a heavy farm wagon, accompanied by Mrs. Ferriss and Miss Nellie Shepherd, artist of Oklahoma city, and with plenty of time, canvas and provisions, the steps of the expedition of 1913 were retraced from Clifton up the San Francisco and Blue rivers to Cosper's ranch, a distance of 50 miles ; then continued up the Blue to its head, and to Luna, New Mexico, all in a northerly direction. From Luna the party turned south-easterly across the San Francisco Mountains of New Mexico, (not Arizona,) to the Mogollon mountains of New Mexico by the way of Alma. The state of Arizona also, by the way, has a range of Mogollon Mountains, further west.

Colonies of *Ashmunella pilsbryana* were found about the Harper ranch, Copper King Mountains, four miles above Clifton, continuing to the mouth of the Blue river; and Sonorellas of different groups to the mouth of the little Blue, a distance by river of about 25 miles.

Many of these colonies were dead, and in others it was difficult to find more than two or three shells alive. The removal of the trees has changed natural conditions; formerly where deep shade and a moistened leaf-mould existed, the soil now baked by the sun, is barren of vegetation. Particularly is this true within twenty miles of the cities and villages. The Mexican is an industrious wood cutter. A white fungus growth also takes posession of the rocky slides which in death turns black, and carries all the lower vegetable life with it. Larger shell life is seldom found in these fungus-stricken areas, where the dead shells lie thick.

While the Sonorellas are found often in the shady, ideal snail talus, some of the colonies survive the timber stripping, and thrive fairly well among dry rocks on southern exposures, often in company with *Thysanaphora hornii*, and if in limestone, with Holospiras.

For thirty miles above the Little Blue river only the smaller species were obtained—mostly Vallonias, Thysanophoras, *Euconulus* and *Helieodiscus*. In the next twenty miles a dozen colonies of the larger *Oreohelix* were located. Again *Oreohelix* was found at about 8000 ft. elevation, while crossing the San Francisco range from Luna to Alma; also on Lisa Creek, draining the San Francisco Mountains.

The upper San Francisco river upon this trail had nothing to offer; but at Mongollon, 7500 feet, the snails were again found friendly. A colony of small *Oreohelix barbata* Pils., was found in the suburbs of that city and from that point to Willow creek, 9000 feet, *Ashmunella mogollonensis* and the larger Oreohelices were never out of sight, presenting interesting variations in size, color and form, and also with the numerous albinos.

At this altitude vegetation and snails thrive equally as well as in eastern Tennessee, also grazing grasses, and the party camped here for a couple of weeks. The trout were fine. Another colony of *Oreohelix barbata* was found at this elevation.

Turning south and eastward from Mogollon, the larger *Oreohelix* disappeared from the gulches. The higher peaks, and the largest and most promising canyon, Whitewater, were left unexplored. The wagon needed a broken road, and as the track down the San Francisco had been destroyed by floods we kept the Silver City road for about thirty miles, then turned southwest at Cactus Flats, driving through a beautiful pasture country for about forty miles. It was so beautiful that we went into camp and cleaned shells for a couple of days on the bank of a shaded stream.

Leaving this pasture country, where we trotted the horses the only time on the trip, the party returned easterly again, and over a rough hilly country of Juniper and rattle-snakes, drove for two and one-half days, to Steeple Rock, a mining town in its resting period. South again fourteen miles to Duncan on the Gila, then thirty-two miles down the river, northwestward, to Clifton. The cowboys cross from Mogollon to Clifton in one day, but it took seven days of travel with a farm wagon. Altogether in three months we made a journey of 335 miles.

Apparently the same snails inhabit this land here, in a direct and pure line of ancestry from those living upon the land before the mountains were uplifted. The conditions after the uplift upon the White and Blue Mountains of Arizona and the northern slope of the Mogollons in New Mexico remain about the same, and with the isolation and the 100 miles of deserts, rivers and mountains between, the Ashmunellas and the Oreohelix are the same. This also remains true of the shells in the Kaibab plateau, northern Arizona.

On both the northern and southwestern slopes of the Mogollons are found all the forms, colors and sizes of *O. barbata*, that the Chiricahua mountains, 125 miles south, have given. This is the only member of the southern mountain groups that has traveled, outside of the small forms, such as Pupas, *Thysanophora* and Vallonias. Where the peaks are sharper, divided by dry gulches, the snails divide into species, varieties and groups. In one limestone slope of the Dragoon mountains a dike of granite 50 feet in thickness divides the Holospiras into two distinct species.

Upon the slopes of the mountains of southern Arizona and New Mexico and the knobs and peaks of the desert this specific development is intensified, and it is but a short distance from one species of *Sonorella* to another. Of the four leading genera of this region, the Sonorellas are best fitted to cope with the drouths and the woodchoppers. If it is limestone country, the Holospiras are tenacious. Both are found in very hot and dry rocks, doing fairly well. Sonorellas, two alive, were found near Castle Rock upon the homeward journey. Other promising prospects were left for another season. This *Sonorella* family follows the mountains down to 3,000 feet in Arizona. Nearly every little hill in Pima county, Arizona, has its own species of *Sonorella.*

Returning to our subject, the Mogollons, two side trips were made into the mountains on foot from Glenwood, New Mexico. In the Little Whitewater canyon one of the smallest of *Ashmunellas* was obtained. A two-days journey in the Cave Creek Canyon secured a larger *Ashmunella* and *Oreohelix barbata*, in large quantities. One juvenile of the larger *Oreohelix* only came to the net.

Another journey of two days was taken up the Dry Canyon, six miles south of Glenwood. Six miles up the Valley a camp was made. Here the precipices boxed in the stream so completely the canyon was not scarred by man or cattle, the stream was full of pound trout, and the slides full of snails.

The Glenwood Ashmunellas had teeth upon the lip, but no lamella or tooth upon the parietal wall. One species measured ten mm. in diameter, the other twelve to fourteen and one-half. In the Dry Creek canyon, measurements ran from ten to sixteen mm. and as to teeth, ran the scale from none to three and a lamella. In twenty colonies there were about as many variations in species and forms, and in some colonies, as with *Ashmunella heterondon.* Pils., all variations in teeth existed. *Oreohelix barbata* varied still more in size and form, with some liberality in color.

Ashmunella mogollensis came in about six miles above camp, and here the vegetation was so luxuriant that Ashmunellas were found in the weeds they slept in. The miner who owned the

cabin at that point was a tight-wad and had locked the door when he left, and thus we slept out a couple of nights.

The Mogollon Mountains at this point run up to 10,500 feet and are termed rough. The roughness consists of granite, quartzite, and various forms of igneous rock, so far as snail hunters have explored. Rocks resembling limestone, and so termed, were found to be a volcanic product.

Above 7,000 feet the timber is heavy and plentiful. Yellow and White Pine, White and Cork Bark Fir, Pseudo Hemlock, Oak and Quaking Asp predominate. Cottonwoods, Sycamore and Walnut dominate the lower valleys, and the Junipers rule in the foot-hills.

It is a large range for the Southwest, at least 100 miles long and thirty to forty wide ; drained southward by tributaries of the Gila, the San Francisco and the Membres rivers.

The indications furnished by these few canyons in a large number opening to the South point to a fruitful field. A well equipped party would require at least one year in which to make a hasty survey. The rainy season starts about the first of July and continues until the middle of August. The summer of 1914 was something unusual however and we had a shower every day except three. Rain however is pleasing to snails. After a good shower they travel over the stones for half a day. The climate above 5000 feet is cool enough for comfort at that season of the year—in truth the temperature is perfect.

The mountains of the Southwest are inexhaustible to the conchologists of this generation. Should any desire to assist in this work, in the Mogollon or other ranges of which we have knowledge, they will find us prompt with both information and advice. There is a larger country than we can hope to explore, all within the states of New Mexico and Arizona.

In another article we hope to give a detailed account of the snails collected, in cooperation with Dr. Pilsbry,—a companion on other Arizona and New Mexico expeditions.

FURTHER NOTES ON THE OLIVIDAE.

BY CHARLES W. JOHNSON.

II. OCCIDENTAL SPECIES.

OLIVA CAROLINENSIS (Conrad).

O. cylindrica Sowerby, Quart. Jour. Geol., vi, p. 45, 1849 (*pars*) not *cylindracea* Borson 1820 = *cylindrica* Ducl., not *cylindrica* Marr. 1870.

O. litterata Lam., Ann. du Mus., xvi, p. 315, 1810 (not Bolten 1798) *Dactylus carolinensis* Conr., Proc. Acad. Nat. Sci., Phila., xiv, p. 563, 1863.

O. circinata Marrat, Thes. Conch., iv, p. 21, pl. 17, f. 277, 1871 ; Johnson, NAUTILUS, xxiv, p. 123, 1911.

Var. *citrina* Johns., NAUT., xxiv, p. 123, 1911.

In substituting a name for *O. litterata* Lam., pre-occupied, I used *O. circinata* Marr., overlooking the fact that it had previously been described by Conrad as a fossil from the Miocene of North Carolina, the synonymy being given by Dr. Dall in his work on the Tertiary Fauna of Florida (Trans. Wagner Free Inst. Sci., vol. 3, pt. 1, p. 44, 1890). As Sowerby's name cannot be considered, I have adopted that given by Conrad. The Miocene and Pliocene forms cannot be separated from the recent. The var. *citrina* is the bright yellow form occasionally found on the Gulf coast of Florida.

OLIVA RETICULARIS Lamarck.

O. reticularis Lam., Ann. du Mus., xvi, 314, 1810.

O. tisophana Ducl., in Chenu's Ill. Conch., ii, pl. 17, f. 17, 18.

O. memnonia Ducl., in Chenu's Ill. Conch., ii, pl. 17, f. 19, 20.

O. olivaceus (Meuschen) Marr., Thes. Conch., iv, pl. 4, f. 46, 47, 51–53.

O. sowerbyi Marr., Thes. Conch., iv, pl. f. 114, 115.

O. reclusa Marr., Thes. Conch., iv, pl. 17, f. 264.

O. mercatoria Marr., Thes. Conch., iv, pl. 17, f. 269.

Var. *nivosa* Marr., Thes. Conch., iv, pl. 17, f. 276.

Var. *bifasciata* Küster ; Conch. Cab., Wienkauff, Oliva, p. 38, tab. 10, f. 8, 9.

hepatica Marr. (not Lamarck), Thes. Conch., iv, pl. 3, f. 27, 28.

formosa Marr., Thes. Conch., iv, pl. 3, f. 29, 30.

Var. *olorinella* Ducl. in Chenu's Ill. Conch., ii. pl. 7, f. 15, 16.

quersolina Ducl. in Chenu's Ill. Conch., ii, pl. 11, f. 7, 8.

pallida Marr. (not Swainson), Thes. Conch. pl. 25, f. 472.

Although not as variable as its Pacific analogue, *O. spicata*, from the west coast of Mexico and Central America, there are several well marked variations and some confusion owing to many of the older authors uniting some forms of the two species. Var. *nivosa* is the large cylindrical form; when banded with brown it is the *bifasciata*. The white form is *olorinella*. *O. pallida* Marr. may possibly represent the albino form of another species.

Oliva fulgurator (Bolten).

Porphyria fulgurator Bolten, Mus. Bolt., p. 36, 1798.

O. fusiformis Lam., Ann. du Mus., xvi, p. 318, 1810.

O. ispidula Link, Besch. Rostock, Samml., part 2, 1807; Marrat, Thes. Conch., iv, pl. 2, f. 15–17.

bullata Marr., Thes. Conch., iv, pl. 24, f. 448.

Var. *obesina* Ducl., in Chenu's Ill. Conch., ii, pl. 17, f. 9, 10.

Both Bolten and Lamarck refer to the same figure by Martini (Conch. Cab. ii, tab. 51, f. 562). Specimens are frequently more or less clouded with brown.

Oliva spicata (Bolten).

Porphyria spicata Bolt., Mus. Bolt., p. 35, 1798.

P. arachnoidea Bolt., Muss. Bolt., p. 36, 1798.

P. litterata Bolt., Mus. Bolt., p. 36, 1798 (not Lamarck, 1810).

O. araneosa Lam., Ann. du Mus., xvi, p. 315, 1810.

O. melchersi Menke, Zeit. für Mal., p. 24, 1851.

Var. *hemphilli* Johns., Nautilus xxiv, 122, 1911.

Var. *subangulata* Philippi, Abb., xix, tab. 1, f. 2.

Var. *oniska* Ducl., in Chenu's Ill. Conch., ii, pl. 32, f. 9.

perfecta Johns., Nautilus xxiv, 122, 1911.

Var. *pindarina* Ducl., in Chenu's Ill. Conch., ii, pl. 12, f. 10, pl. 17, f. 7, 8.
punctulata Marr. Thes. Conch., iv, pl. 2, f. 12, 13.
harpularia (Lam.) Reeve, Conch. Icon., pl. 14, f. 28 (decorticated).
Var. *venulata* Lam. Ann. du Mus., xvi, 313, 1810.
reticularis Reeve (pars) Conch. Icon., vi, pl. 10, f. 16 b.
obesina Reeve (pars) Conch. Icon., vi, pl. 10, f. 16 c.
mariae Ducros, Rev. crit., p. 50, pl. 2, f. 26.
Var. *graphica* Marr., Thes. Conch., iv, pl. 3, f. 36.
porcea Marr., Thes. Conch., iv, pl. 3, f. 35.
oblonga Marr., Thes. Conch., iv, pl. 2, f. 14.
Var. *violacea* Marr., Thes. Conch., iv, pl. 4, f. 56.
Var. *ustulata* Lam., Anim. sans vert., v, 620, 1822.
oriola Ducl. (not Lam.), in Chenu's Ill. Conch., ii, pl. 11, f. 1, 2.
fuscata Marr., Thes. Conch., iv, pl. 2, f. 20–22.
brunnea Marr., Thes. Conch., iv, pl. 4, f. 54, 55.
Var. *polpasta* Ducl. in Chenu's Ill. Conch., Pl. 17, f. 1, 2.
Var. *cumingi* Reeve, Conch. Icon., vi, pl. xi, f. 19.
ligneola Reeve (pars) Conch. Icon., vi, pl. 21, f. 57 a b (juv.)

Bolten and Lamarck again refer to the same figure by Martini (Conch. Cab., ii, tab. 48, f. 509). Bolten refers to it a second time as his type of *arachnoidea*, while the figure he refers to as the type of his *litterata* (Conch. Cab., ii, tab. 46, f. 488) is not sufficiently characterized for varietal distinction. The above varieties were briefly diagnosed in my previous paper (NAUTILUS, xxiv, p. 122, 1911).

ON CLASSIFICATION IN GENERAL AND THE GENUS LYMNAEA IN PARTICULAR.

BY HAROLD SELLERS COLTON.

The value of the generic name is the subject of this paper. To illustrate this, the genus *Lymnaea* is considered.

The most recent classification of this group is that of F. C.

Baker in his admirable "Lymnaeidae of North and Middle America" (Chicago Academy of Sciences Pub. No. 3, 1911) p. 120. Whereas the older classifications considered shell characters alone, this author "proposed to classify the Lymnæids by the characters of the shell, genitalia (shape of prostate, relative size and form of the penis and penis-sac) and radula."

On a basis of these criteria he has split the genus *Lymnæa* as defined by Haldeman 1840, Gould, Binney 1868, Dall 1871, Tryon 1872 & 1884 and more recently by Dall in 1905, into six genera:— *Lymnæa*, *Pseudosuccinea*, *Radix*, *Bulimnæa*, *Acella* and *Galba*. He has done this mainly by raising a number of subgenera and sections of former authors to generic rank. I wish to ask this question: Is this at the present time justifiable? (1) Baker lists 103 species and varieties of the old *Lymnæa* in this work. Of but 33 have anything of the anatomy, radula and genital organs been studied. Therefore the shell characteristics are the important ones after all. (2) All these new genera are based largely on quantitative characters. The only qualitative character mentioned is the radula and this is given quite a subordinate place in the classification. (3) In his diagnosis of the genus *Galba* in his key he states that the "Penis (*epiphallus*) is shorter than the penis-sac" (Penis).[1]

However, for two of the species of this genus the epiphallus is longer than the penis. See Baker p. 263 and 277.

In the mind of the writer our present knowledge will not allow us to make a comprehensive classification of the Lymnæids based on the anatomy of the snail. We know too few species well. On the other hand the shell characters alone in a mollusk with such a generalized form of shell as have the Lymnæids are not characters on which one can base much reliance.

On account of these reasons the writer would make the recommendation that the old genus *Lymnæa* should be retained in the sense that it has been used for the past seventy years. These

[1] I am indebted to Dr. H. A. Pilsbry for calling my attention to the fact that Baker has called the *epiphallus* the penis, and the true penis he has called the penis-sac. In this paper I will adhere to the general usage and refer to the epiphallus and penis instead of penis and penis-sac.

new genera of Baker will then become sub-genera. The sub-genera of Baker will be reduced to sections with one exception, viz., that of *Simpsonia*, now *Pseudogalba*, be retained as a sub-genus. This form seems to the writer, on account of the character of the radula, to be sufficiently different to cause its removal from the sub-genus *Galba*. We have then the following classification :–

Genus *Lymnæa* Lamarck.

Subgenus *Lymnæa* contains the *stagnalis* group.

Subgenus *Pseudosuccinea* contains the *columella* group.

Subgenus *Radix* contains *L. auricularia.*

Subgenus *Bulimnæa* contains *L. megasoma.*

Subgenus *Acella* contains *L. haldemani.*

Subgenus *Pseudogalba* (*Simpsonia*) contains the *humilis* and *obrussa*, *umbilicata* and *parva* groups.

Subgenus *Galba* contains the section *Galba*, and the *palustris*, *catascopium* and *emarginata* groups.

The classification recommended above has certain advantages over that proposed by Baker in that it indicates differences between groups of snails but does not commit one to place a shell the anatomy of whose animal is unknown in a given genus. It can be provisionally placed in a subgenus by superficial resemblance and if later changed will not affect the generic name. *It is by the generic name that animals are catalogued.* This is a very important practical matter and one that cannot be too much emphasized. To change generic names without an overwhelming amount of evidence in favor of the change is hindering instead of advancing the science. Species and minor groups on the other hand cannot be too much subdivided. It is an advance to describe every variation that can be distinguished. Of this work Bateson (Problems of Genetics, p. 249) says :– "They will serve science best by giving names freely and by describing everything to which their successors may possibly want to refer and generally by subdividing their material into as many species as they can induce any responsible society or journal to publish." It must not be thought that the writer of this is trying in any way to slight the value of Baker's work. It is a work of very great value and splendidly arranged. The clear statement of what we know of the group and what we do not know is most important. It is a model which many should follow. It has been the constant companion and guide of the writer for the past two years. He does not wish this paper to be considered a criticism but rather as an appendix to

that work, making it, if possible, still more valuable to students of American mollusks.

To recapitulate : generic names are those by which animals are catalogued, therefore should not be changed without overwhelming evidence in favor of the change. This value of the genera in cataloguing has not been sufficiently emphasized.

A PROVISIONAL KEY TO THE SUBGENERA AND SPECIES OF NORTH AMERICAN LYMNAEIDS.

BY HAROLD S. COLTON.

The following is a preliminary key to some of the best known species in the genus Lymnaea. It is based on a careful study of the wealth of material in Baker's Lymnaeidae of North and Middle America. To this the writer has added a little that has come under his observation during the past eight years that he has been working with this group.

It must be noted that *L. auricularia* appears in two places in the key. This is because the radula of the Philadelphia form is different from the radula of the Chicago form.

It must be remembered also, as stated in the preceding article that the radula and character of the reproductive organs are the important characters in classification as the shell is such a generalized form. This being the case it will be of value in locating but 33 species and varieties as the other 73 have been described by shell characters alone. When they have been studied the key no doubt will have to be much modified.

The writer found it impossible to sub-divide the groups in his key. The species within a group are distinguished by shell characters alone, and although one familiar with species can distinguish them without much difficulty, it is almost impossible to state the differences in a few words.

This key is intended as a supplement to that of Baker p. 125. It makes no pretense of completeness. The writer, therefore, would be glad to hear of any practical difficulties arising in its applicaton.

In the following key the ratio between the aperture length and the shell length is referred to as the "ratio."

GENUS LYMNAEA:—

Fresh-water pulmonate mollusks. Shell : normally dextral, rarely sinistral, ovately oblong to elongate. Animal: with a short, wide, rounded foot. Tentacles : flattened. Central tooth of the radula unicuspid ; laterals bi-or tri-cuspid. Male and female genital openings separate and on the right side. Mantle margins contained within the shell.

(I) The first lateral tooth of the radula has three cusps, the others two.

The epiphallus longer than the penis. Color pattern of the mantle conspicuous. Adult with a flaring lip (Subgenus Radix) *L. auricularia* p. 179

(II) The lateral teeth of the radula with two cusps.

(1). 1st cusp grooved : epiphallus less than penis. (Subgenus *Acella*) *L. haldemani.* . . . . p. 192

(2). 1st cusp ungrooved.

(A) Axis gyrate : epiphallus ¼ of penis—(Subgenus *Lymnæa*)—*Stagnalis* Group. . . . p. 136

(B) Axis not gyrate. Epiphallus equal or less than the penis but over ½. (Subgenus *Galba*).

(a) with not evident spiral sculpture—*Galba* Group . . . . . p. 200

(b) with evident spiral sculpture.

(aa) Ratio between two and three—*Palustris* Group . . . . . p. 298

Ratio between 1½ and two.

(aaa) Ovate shell, narrow inner lip, no true umbilicus—*Catascopium* Group . . p. 377

(bbb) Bulbous shell, wide inner lip and umbilicus—*Emarginata* Group . . . p. 408

(III) Lateral teeth with three cusps.

(1) Axis gyrate.

(A) Epiphallus less than the penis ; shell succiniform Subgenus *Pseudosuccinca*—*Columella* Group . p. 162

(B) Epiphallus less than the penis.

(a) Shell thin and transparent—color pattern of mantle visible through shell—lip flaring in adult—ratio less than 1½. (Subgenus Radix) *L. auricularia* . . . . p. 179

(b) Shell solid bulimiform—ratio greater than 1½. (Subgenus Bulimnea). *L. megasoma* . . . . . p. 183

(2) Axis not gyrate (Subgenus Pseudogalba). Epiphallus usually shorter than the penis.

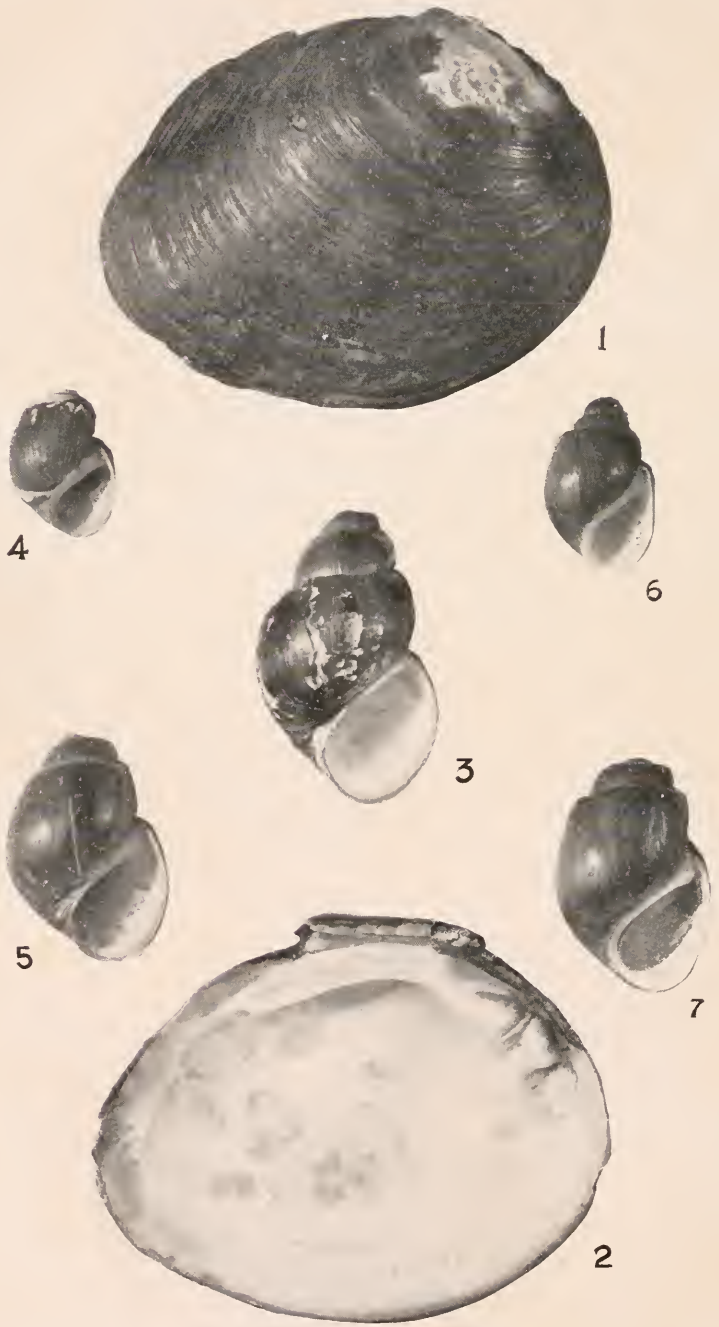
(aa) Inner lip flattened out and excavated. *L. umbilicata* . . . . . p. 236

(bb) Inner lip erect. *L. parva* . . . p. 243

(b) Epiphallus usually longer than the penis.

(aa) 10 mm. long, has 5 whorls *L. humilis.* . . . . . p. 25

(bb) 10 mm. long, has 4 whorls *L. obrussa.* . . . . . p. 270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ON PALUDINA COARCTATA AND INCRASSATA LEA.

BY BRYANT WALKER.

The descriptions of both of these species were read by Dr. Lea before the American Philosophical Society on Dec. 16, 1842 and were published on or before Jan. 3, 1843. Since that time they have led a varied and precarious existence at the hands of subsequent authors. Lea's types were, in both instances, single, imperfect specimens received from Dr. Foreman without any more precise locality than that of "Alabama." Lea never figured either of his species. But this was done by W. G. Binney twice, though the two figures in each case are so dissimilar that it does not seem possible that they could have been drawn from the same specimens, were it not so stated by the author.

Binney in his preliminary "Descriptive Catalogue of the species of Amnicola, Vivipara, etc. of North America", published by the Smithsonian Institution in 1862 and purporting to be "proof", not only published a figure of the type of *coarctata*, but also one of "a perfect specimen" from the Lea collection. In this paper he recognized the species as a valid one, but added to it as synonyms the *exilis* and *lima* of Anthony.

In the same paper he also figured the *incrassata* and gave it specific rank.

In this final work, "Land and Freshwater Shells of North America, Part III," (1865), he omitted the figures of *coarctata*

published in 1852 and gave a new figure of the type, (fig. 108) and also presented his own description of the form as he understood it, which he illustrated by two figures under one number, (fig. 106). Both his description and these figures are excellent and represent a well marked form, which is abundantly found in the southern states from Alabama to Arkansas. He also retained the synonymy given in 1862.

In this work he referred *incrassata* to *Lithasia* and gave a new and better figure of the type.

In the Conchologia Iconica, (1863), Reeve followed Binney in uniting *coarctata* Lea and *exilis* Anth., but considered *lima* as specifically distinct. His figure of *coarctata* represents *exilis* and was drawn from the same specimen figured by Binney, as Anthony's type.

In 1869, Dr. James Lewis, (Am. Jour. Con., V, p. 34), from the examination of a series from the Coosa River in the Wheatley collection, came to the conclusion that "all the probabilities of the case point very strongly to the *supposition* that the true *coarctata* is a young shell from the Coosa River which, when mature, received the name *ponderosa*." While expressly refusing "to decide any question of difference or of identity between '*ponderosa*' of the Coosa and of the Ohio system of rivers," Dr. Lewis was evidently very strongly inclined to the opinion that the two forms were specifically distinct. On p. 36, Dr. Lewis also refers to specimens from Corinth, Miss., in the Wheatley collection labeled "*coarctata* Lea," which seem to be identical with the *coarctata* of Binney and concludes : "It is needless to add that this species is not *coarctata*; it is one, which in a careful review of this genus, should receive a distinct designation."

Apparently, Dr. Lewis has long before come to the same conclusion, as Binney states that as early as 1862, there were in the Smithsonian Museum, specimens of his, Binney's, *coarctata* from Jackson, Miss., labeled "*compressa* Lewis." Dr. Lewis, however, never published any description of his *compressa* and, so far as I have been able to ascertain, never referred to it in any of his writings.

Later, however, in his "Fresh-water and Land Shells" of Alabama, (1876), he somewhat modified his opinion. In the

body of the Catalogue, he lists *nolani*, *coarctatus* Lea and *incrassatus* as varieties of *ponderosus* and the *coarctatus* of Binney as *decisus* (coarctate var.) In the appendix, however, he states that "it is inferred that *coarctata* and *incrassata* are identical with the shells Mr. Tryon calls *nolani*" and "if the species really be distinct from *ponderosus*, it should receive the name of *coarctata* or *incrassata*, either of which has priority of *nolani*." He also says "a slender variety of *M. decisa* occurring in Big Prairie Creek has been confounded with the Coosa shell that Mr. Lea calls *coarctata*. There are peculiarities of form and color that should forbid the association of the Prairie Creek shell with the Coosa River *coarctata*."

Tryon, in his Continuation of Haldeman's "Monograph of the Fresh-water Univalve Mollusca of the United States," (1870), separated the Coosa River form of *ponderosus* as a distinct species under the name of *nolani*. He gave *incrassata* specific rank with *decapitata* Anth. as a synonym and figured both, apparently, from the type specimens. He also recognized *coarctata* as a distinct species with *exilis* Anth. as a synonym, and thinks "the Alabama locality (for *coarctata*) somewhat doubtful." His figure represents the typical form and not the *coarctata* of Binney.

In 1886. R. E. Call published an elaborate paper "On the Genus Campeloma Rafinesque with a revision of the Species," (Bull. Wash. Coll. Lab., I, pp. 149–165). His treatment of Lea's *coarctata* is very blind. Apparently by some oversight, he makes no reference to Lea's *coarctata* in his synonymy. But he includes Binney's (1865) figure of Lea's type, (Pl. IV, fig. 10), in the figures stated on p. 155 to represent *subsolidum* Anth. Why he did not give precedence to Lea's name, if he intended to unite the two forms, is difficult to understand.

He refers both *incrassata* Lea and *decapitata* Anth. to *decisum* as synonyms and adds :

"*Melantho* (*Paludina*) *coarctata*, *ex auctores in partim non* Lea (=*subsolidum* Anthony)." Just what this was intended to mean is perplexing, as he refers Binney's figures of his *coarctata* (Pl. iv, figs. 8 and 9), to *subsolidum* on p. 155. With this exception, there is no reference to Lea's species in his paper save some cursory remarks in his discussion of *lima* Anth.

In a later paper, ("On Geographic and Hypsometric Distribution of North American Viviparidae," Am. Jour. Sci., xlviii, 1894, pp. 132–141), however, he seems to have adopted Binney's conception of *coarctata*, which he recognizes as a valid species. In connection with *C. subsolidum*, he states that "to the south of Missouri, it is replaced by its congener, *Campeloma coarctatum* Lea". And on p. 137, he says "over all the states from Arkansas south to Texas and east to central Alabama ranges a form, to which Mr. Lea gave the name of *Campeloma coarctatum*. It appears to be most nearly related to *Campeloma subsolidum*, being related to it as *Campeloma lima* is related to *Campeloma rufum*".

From a careful study of a very considerable amount of material from Alabama, Mississippi, Louisiana, Texas, Arkansas and Missouri collected by Wheeler, H. H. Smith, Hinkley, Singley and others, including the Lewis collection, I have come to the conclusion that Dr. Lewis was entirely right in his judgment as to these several forms. Figures 4 to 7 on my plate are from shells in his collection and no doubt, were considered by him at the time he prepared his Alabama Catalogue.

Lea's *incrassata* is a deformed, depauperate specimen. Mr. W. B. Marshall of the National Museum has kindly compared the original of my figure 4 with Lea's type and writes: "It is like Lea's type of *incrassata* in practically every detail. Your shell is a trifle larger". Figure 5 is a larger example of the same kind, less aberrant and connecting up directly with the typical form. Figure 6 is the typical *coarctata* of Lea and is also the normal young shell of Tryon's *nolani*. Figure 7 is the mature form of fig. 6 and the usual manifestation of the Coosa form known as *nolani*. It grows larger than that occasionally and is frequently more inflated. But, on the whole, the Alabama form is differentiated from the typical *ponderosum* of the Mississippi system by its more elongated, more cylindrical and less inflated form. I have seen no specimens that agreed exactly with Tryon's figure 10. It would seem either to be an extreme, aberrant example or to have had its peculiarities exaggerated in drawing. But there can be no doubt but that the three forms described as *incrassata* Lea, *coarctata* Lea and *nolani*

Tryon are individual variants of the same species. Whether the Alabama race should be considered simply a variety of the typical *ponderosum* of the Mississippi system or be given specific rank is largely a matter of individual opinion. Dr. Lewis was evidently, at one time, inclined to consider them specifically distinct, but his latest opinion was, apparently, different. Personally I am inclined to consider them local races of a common species.

The name that should be used for the Alabama race presents an interesting question. *Incrassata* and *coarctata* were not only described at the same time, but both descriptions were published on the same page, *incrassata* preceding *coarctata*. If the rule of priority applies to page precedence, it would be necessary to use Lea's first name, *incrassata*. But this would be very unfortunate ; for the specific type would be an immature, deformed and depauperate example. On the other hand, while the type of *coarctata* is also a young shell, it is, nevertheless, a perfectly normal one and represents the species much more correctly. It is, therefore, very desirable to use that name, if it can be done without violating the provisions of the International Code. On referring the question to Dr. Pilsbry, he replies :—

"In this kind of a case, it is held that *the first reviser may select which name may hold.* Jordan and some others consider position on a page as giving "precedence," a view which has been vigorously combated and which has not been supported by the International Committee on Nomenclature, who hold that all names on one page, or indeed in one work, were published simultaneously (see Opinion 40 of the International Committee on Nomenclature). Personally I believe in Jordan's view, as an artificial precedence is better than no rule. You have, however, the right to decide either way under the rules".

Under this opinion and for the reason above given, I select "*coarctata* Lea" as the name to be used for this form.

The synonymy, therefore, becomes as follows :

CAMPELOMA PONDEROSUM COARCTATUM (Lea). Pl. V, figs. 4–7.

1843. *Paludina coarctata* Lea, Pr. Am. Phil. Soc., II, p. 243.

1862. *Vivipara coarctata* W. G. Binney, Desc. Cat., p. 30, figs. 50–51.

1865. *Melantho coarctata* W. G. Binney, L. & F. W. Shells, III, p. 53, fig. 108.

1869. *Melantho coarctata* Lewis, Am. Jour. Con., v, p. 34.

1870. *Vivipara coarctata* Tryon, Mon., p. 32, pl. 15, fig. I.

1876. *Vivipara* (*Melantho*) *ponderosus coarctatus* Lewis, Fauna of Ala., L. & F. W. Shells, pp. 24 and 40.

1886. *Campeloma subsolidum* Call, Bull. Wash. Coll. Lab., I, pl. iv, fig. 10.

1843. *Paludina incrassata* Lea, Pr. Am. Phil. Soc., II, p. 243.

1862. *Vivipara incrassata* W. G. Binney, Desc. Cat., p. 34, fig. 58.

1865. *Lithasia incrassata* W. G. Binney, L. & F. W. Shells, III, p. 65, fig. 65.

1870. *Vivipara incrassata* Tryon, Mon., p. 29, pl. 15, fig. 7.

1876. *Vivipara* (*Melantho*) *ponderosus incrassatus* Lewis, Fauna of Ala., L. & F. W. Shells, pp. 24 and 40.

1886. *Campeloma decisum* (part) Call., Bull. Wash. Coll. Lab., I, p. 156.

1870. *Vivipara nolani* Tryon, Mon., p. 25, pl. 12, figs. 10–11.

1876. *Vivipara* (*Melantho*) *ponderosus nolani* Lewis, Fauna of Ala., L. & F. W. Shells, pp. 24 and 40.

1886. *Campeloma ponderosum* (part) Call, Bull. Wash. Coll. Lab., I, p. 154, pl. III, figs. 8–9.

This disposition of Lea's *coarctata* necessitates a new name for the *coarctata* of Binney. I propose to call it *Campeloma lewisii* in memory of Dr. James Lewis, who was the first to recognize its specific distinctness from Lea's *coarctata*.

The synonymy will be as follows :

Campeloma lewisii n. n. Pl. V, fig. 3.

1865. *Melantho coarctata* W. G. Binney, L. & F. W. Shells, III, p. 52, fig. 106.

1869. *Melantho* sp.? Lewis, Am. Jour. Con., v, p. 36.

1876. *Vivipara* (*Melantho*) *decisus* (coarctate var.) Lewis, Fauna of Ala., L. and F. W. Shells, pp. 24 and 41.

1886. *Campeloma subsolidum* (part) Call, Bull. Wash. Coll. Lab., I, p. 155, pl. iv, figs. 8–9.

1894. *Campeloma coarctatum* Call, Am. Jour. Sci., xlviii, p. 137.

Binney's description of his *Melantho coarctata* is very apt and his figures, (fig. 106), are excellent, though smaller than the species frequently attains in its maximum development. For this reason and because there is no locality indicated for the shells figured by Binney, I have chosen as the types a series from the Yallabusha River, Grenada Miss., collected by Hinkley.

The figured type, apex eroded and with only three whorls remaining, measures alt. 38.75, diam. 23.5 mm. I have before me a specimen from Village Creek, Hardin Co. Texas, collected by Singley, which, with only two whorls remaining, measures alt. 42, diam. 25.5 mm.

Campeloma lewisii is an abundantly distributed species in the southern states, ranging west from Alabama, through Mississippi and Louisiana, to Texas and north to Missouri and (possibly) to southern Illinois, (See Baker, Bull. Ills. St. Lab. N. H., vii, 1906, p. 89). Apparently it flourishes to the best advantage in the warm waters of the southern rivers as the specimens from Mississippi and Texas are larger and heavier than those from northern Alabama and Arkansas.

Compared with *subsolidum*, which it apparently replaces in the Gulf States, it is a thinner, lighter shell, the spire is usually more or less flattened and the suture less impressed and the whorls lack the shoulder, which is usually well marked in *subsolidum*. It is more closely related to *decisum* but differs in size, shape and texture, the suture is less impressed, the spire more produced, the body whorl proportionately longer and the aperture is a more elongated oval.

I have it before me from the following localities : Flint River, Gurley ; and the Tombigbee River, Demopolis, Ala.; Big Black River, Durant ; Tombigbee River, Columbus ; Tallahatchee River, Abbeville ; Yallabusha River, Grenada ; Pearl River and Conway's Slough, Jackson and a branch of the Tangipahoa River, Pike Co., Miss.; Lake Bisteneau, Bienville, La.: Caddo Lake and Village Creek, Hardin Co., Texas, Cypress Creek, Ouachita River and Old River, Arkadelphia ; Big Deciper Creek, Clark Co.; Cache Creek, Nemo and the St. Francis River, Lake City, Ark. and "Missouri."

POLYGYRA INFLECTA MOBILENSIS NEW VAR.

BY GEO. H. CLAPP.

A very interesting form of *P. inflecta* has recently been found by Mr. L. H. McNeill in Mobile, Ala., and as it seems to be constant, having been found in two different parts of the City and on Dauphine Island, I have named it as above.

It differs from the type in being flatter, with the last whorl less swollen beneath, the teeth small and weak, and in always having the umbilicus *partly uncovered*; white to light-horn-color but "when found the shells are covered with a black, *very* adherent coating".

On Dauphine Island, in the Gulf just at the entrance to Mobile Bay, Mr. McNeill found dead shells of the same form.

The majority of the shells have about one half whorl less than the typical form, from Mobile, as shown by measurements below.

Six examples, the largest to smallest, measure :

Gr. diam,	$11\frac{1}{2}$,	alt.,	6	mm.	whorls	5
" "	$11\frac{1}{2}$,	"	$5\frac{3}{4}$	"	"	$4\frac{1}{2}$
" "	$10\frac{1}{2}$,	"	$5\frac{1}{2}$	"	"	$4\frac{1}{2}$
" "	$10\frac{1}{2}$,	"	5	"	"	$4\frac{1}{2}$
" "	$10\frac{1}{4}$,	"	5	"	"	$4\frac{3}{4}$
" "	10,	"	$5\frac{1}{4}$	"	"	$4\frac{1}{2}$

Five typical shells from Mobile measure :—

Gr. diam.	$10\frac{3}{4}$,	alt.	$6\frac{3}{4}$	mm.	whorls	5
" "	$10\frac{3}{4}$,	"	$6\frac{1}{2}$	"	"	5
" "	$10\frac{1}{2}$,	"	6	"	"	5
" "	$10\frac{1}{2}$,	"	6	"	"	5
" "	10,	"	$6\frac{1}{4}$	"	"	5

Types number 7163 of my collection.

THE EARLIEST NOTICE OF A SPECIES OF THE GENUS GUNDLACHIA.

BY WM. H. DALL.

Rummaging through the volumes of the "Skrivter" of the Natural History Society of Copenhagen in which Lorenz Spengler

printed many of his papers toward the end of the 18th century, I recently came on a little paper by Martin Vahl on a new species of *Patella*. Vahl was a Danish Naturalist who wrote chiefly on vertebrates, and after whom Mörch named the Greenland species of *Lymnæa*.

It is probable that he was also interested in botany, as he relates that he found his *Patella* (in the Linnean sense) on the blades of a species of the genus *Aponogeton* from the East Indies. He states that of the Linnean species of *Patella*, it is nearest to *P. fornicata* and *porcellana* (both now placed in the genus *Crepidula*).

His shell was of about the size of a grain of wheat, horny, fragile, smooth, with a reticulation of brown lines ; the apex short, blunt, basal and somewhat incurved; the base with a transverse horizontal lip less than a quarter of the basal length. The station of the shell in fresh waters on the blades of *Aponogeton* in the East Indies. The shell is not figured, but it seems certain that nothing but a species of the group called *Gundlachia* can correspond to this description, read in 1796, and published in 1798, in the fourth volume of the Skrivter, part 2, pp. 153–5. He called the species *Patella aponogetonis*. It was not until 1849 that Pfeiffer proposed the name *Gundlachia* for a Cuban species.

STUDIES IN NAJADES.

BY A. E. ORTMANN.

(*Continued from page 69.*)

CARUNCULINA PARVA (Barnes). (See Ortmann, 1912, p. 338.)

I received a number of specimens from Arkansas through H. E. Wheeler. Gravid females, with glochidia, were collected in the Ouachita River, Arkadelphia, Clark County, on May 19 and June 23, 1911. Among many specimens collected in Saline River, Benton, Saline County, on July 13, 1911, no gravid

females were present. The same was the case in specimens from Big Deceiper Creek, Gum Springs, Clark County, collected September 25, 1911. Of two gravid females collected in Malvern Creek, Malvern, Hot Springs County, June 10, 1912, one had eggs, the other glochidia. Another female, collected August 9, 1912, by A. A. Hinkley in Big Creek, Solitude, Posey County, Indiana, was gravid with eggs. As will be remembered, I found myself gravid females with eggs in Pennsylvania on June 17, 1909.

Thus eggs are known to occur on June 10, June 17 and August 9, while glochidia were present on May 19, June 10 and June 26. These records are rather confusing. It may be that the beginning of the breeding season is irregular (June to August), and that the glochidia are discharged in June, so that the end and beginning of the season overlap. But this should be studied more closely.

In the female the inner mantle-edge in front of the branchial has the following structure: First, immediately in front of the branchial, there is a group of four to six small papillae with black base and whitish tips; then follows a slightly lamellar expansion of the inner edge, which is right in front of those papillae thickened, so as to form the "caruncle." This caruncle may be white or brownish (chestnut), of various shapes, cylindro-conical, or pyramidal, or semi-globular, sometimes somewhat divided. In front of the caruncle the edge is slightly wavy and disappears soon. The group of small papillae, with their black base, form a more or less marked black spot, and sometimes this black color extends forward and backward, forward so as to enclose the base of the caruncle, backward along the base of the papillae of the branchial. Also in the male the group of small papillae is present and marked by a black spot, and in front of this the inner edge is slightly lamellar, but without a caruncle.

In most of the specimens recently investigated, the supraanal opening was not closed, but normal, separated from the anal by a mantle connection a little shorter than the supraanal, but as long as or slightly longer than the anal. But in one specimen from Malvern, a male, the supraanal is undoubtedly

closed, thus confirming my previous observation in Pennsylvanian specimens; but this character is apparently not constant.

Glochidia subovate, anterior, ventral, and posterior margins forming a rather regular curve. They are somewhat higher than long, but not quite so high as in Lea's figure (Obs. 13, 1874, pl. 21, f. 3). Length, 0.18; height, 0.20 mm.

(*To be continued.*)

NOTES.

HELIX HORTENSIS FROM A MAINE SHELL HEAP.—Dr. Glover M. Allen, in company with Mr. James F. Porter, while excavating in a shell heap on Great Spruce Head Island, Penobscot Bay, found *Helix hortensis* at a depth of from one to two feet below the surface, associated with bones of the large extinct mink—*Mustela macrodon* Prentiss. Although this mink has probably not been extinct for any great length of time, the association of the two forms is another evidence in support of the conclusion that the presence of *H. hortensis* in North America is in no way associated with its settlement by Europeans. Mr. Porter also found a fresh specimem of *H. hortensis* near Duck Harbor, Isle au Haute, Me., a new locality for the species. —C. W. JOHNSON.

CÆCILIOIDES GUNDLACHI (PFR.) IN FLORIDA :—In March, 1914 Mr. John B. Henderson sent me two bags of dirt gathered on the south bank of the Miami River about two miles above Miami, and in it I found four specimens of the above species. This may be the species collected by Bartlett in Florida many years ago and called "*C. acicula*" by Binney ; Manual, p. 429, as *acicula* has never been found there by recent collectors. Pilsbry, Manual of Conchology, second series, Vol. XX, p. 43, states that the shells found by A. D. Brown at Princeton N. J., "no doubt imported with West Indian plants," are *gundlachi* although Binney recorded them in the Manual as *acicula*. —GEO. H. CLAPP.

Bulimulus schiedeanus (Pfr.) in Texas :—In May 1913, Mr. Walter E. Koch found dead shells of this species near Terlingua, Brewster Co., Texas which are indistinguishable from Mexican specimens. The largest measures $41\frac{1}{2}$x$21\frac{1}{2}$ mm, with seven whorls.—Geo. H. Clapp.

Dr. Ortmann informs us that he has received a letter from Dr. F. Haas, of the Senckenburg Museum, Frankfurt a. M. He is in Spain. At the beginning of the war, he was in the High Pyrenees, and descending into French territory, was seized. All his belongings were taken from him by the French authorities, including his collections, and he was finally permitted to pass over into Spain.

After many hardships, on account of lack of funds, he was at last taken care of by a branch-plant of an electric company of his home town. He is now there, and his address is : Care of Sociedad Electro-Quimica, Flix (Tarragona) Spain.

Viviparous Urocoptidæ—While going over Urocoptids in the Museum I noticed that *Brachypodella* (*Liparotes*) *obesa* and *suturalis* (Weinl.) are both viviparous. Shells of both species contain young of two or three whorls. You may already know this, but I do not find it recorded.—W. F. Clapp, Museum of Comparative Zoology.

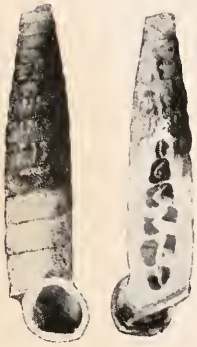
Gundlachia or Navicella ?—As a supplement to Dr. Dall's article on the earliest notice of *Gundlachia* it may be as well to mention that on looking over Vahl's paper I was struck by the resemblance of his "Patella" to the genus *Navicella*. I see that Tryon (Man. Conch. X) has taken the same view.—H. A. Pilsbry.

1

1a

2

2a



3

4

5

6

6a

6b

7

7a

8

1–3, 5. RAMSDEN: CUBAN LAND SHELLS.
4. HENDERSON: MICROCERAMUS LONGUS.
6–8. CLAPP: NEW SPECIES OF VERTIGO.

The Nautilus.

Vol. XXVIII. APRIL, 1915. No. 12

ON SOME NEW CUBAN LAND SHELLS.

BY CHARLES T. RAMSDEN.

Among numerous interesting finds in the district of Guantánamo during the winter, three very distinct forms are selected for the following descriptions. Others are being worked up, and the descriptions will shortly follow.

Urocoptis (Arangia) scobinata Torre and Ramsden, n. sp. Plate vi, figs. 3.

The shell is column-shaped, the upper half tapering to a rather wide truncation ; waxen white, the base livid brown near the lip, both within and externally ; without gloss ; sculptured with thin, delicate rib-striæ which are stronger near the lower suture on each whorl, and are distinctly crimped ; the irregularities being regular in successive riblets give an appearance of spiral sculpture. The whorls are nearly flat, parted by a distinctly impressed suture. The upper breach is closed by a flat, vertical septum, usually concealed by persistence of part of a whorl above it. The last whorl has a very prominent carina defining the base, which is slightly convex. The aperture is vertical, irregularly rounded, bluntly angular at the termination of the keel. Peristome thin, reflected, adnate for a short distance above. The internal axis bears a

single smooth median lamella which becomes very much weaker in the penultimate whorl.

Length 33.5, diameter 6.5 mm ; 13 whorls remaining.

Length 31.5, diameter 6.5 mm.

Locality.—Subida a "La Hembrita", Monte Toro, Guantánamo. Type No. 111446 A. N. S. P., paratypes in collections of Torre and Ramsden.

This species differs from *U. sowerbyana* Pfr. in the following details. The delicate riblets are distinctly crimped, while in *sowerbyana* they are even ; the basal carina is decidedly more prominent ; the axial lamella is thinner, and in the penultimate whorl it is weaker ; the lip is shortly adnate above ; finally the color of the aperture differs.

The mantle of the animal is black, with white flames widest at the upper suture, and some small white spots between the flames. In life it shows through the shell, as in the figure.

The jaw and radula of this species have been examined by Dr. Pilsbry, who supplies the following notes. The jaw is extremely thin, composed of about 65 delicate narrow plaits, the middle ones forming a triangular area of short plaits. The radula has about 19.1.19 teeth, shaped like those of *U.* (*Esochara*) *fabreana*. The central tooth is very narrow as in *Esochara*. The dentition of the subgenus *Arangia* was not known before, but it confirms the inferences drawn from the shell as to the general position of the group. By the greater number of teeth it is more generalized than the other Cuban subgenera of *Urocoptis*.

Diplopoma torrei, n. sp. Plate vi, figs. 1, 1*a*.

The shell is scarcely perforate, pupiform, truncate, slightly more than four whorls remaining in the adult stage ; russet vinaceous or almost white, with some small darker spots disposed in vertical series and upon the subsutural projections.

Sculpture of very low, rather wide, rounded spirals on the last 2 or $2\frac{1}{2}$ whorls, becoming strong at the base and in the umbilicus of the last whorl ; about seven of these spirals visible on the penultimate whorl. Vertical sculpture of crowded, fine rib-striæ, which are slightly thickened where they pass over the spirals. The whorls are moderately convex, broadly ap-

pressed and irregularly, deeply laccrated above. The aperture is slightly longer than wide: peristome narrowly reflexed, thin, fluted, and having a small lobe at the upper extremity.

The operculum shows three whorls and a gray sunken nucleus externally, the whorls flat and tangentially striate, separated by a deep narrow suture. The inner face is concave and light yellow. The edge shows the two layers separated by a very deep cleft.

Length 15, diam. of last whorl, above the aperture 7 mm.; longest axis of aperture outside peristome 6 mm.

Locality.—Ojo de Agua range, between Guantánamo and Ramon de las Yaguas. Types No. 111445 A. N. S. P., paratypes in Ramsden collection.

This species differs conspicuously from *D. architectonicum* in both shell and operculum, but the latter has the very deep peripheral cleft characteristic of the genus. It was a great surprise to come upon a new species of this group.

Rhytidopoma Tollini, n. sp. Pl. vi, fig. 5.

The shell is umbilicate, conic, composed of 4½ strongly convex whorls. The summit is somewhat mamillar and distorted, the first whorl extremely convex, smoothish, next half whorl narrower. The last two whorls have a sculpture of very irregular, in part twinned axial laminæ which are enlarged at intervals in spiral bands, of which there are about 12 on the last whorl at the aperture; those on the inner (umbilical) side crowded, the rest widely spaced and larger, giving the appearance of coarse, low, spiral cords. The suture is irregular by the unequal prominence of the laminæ. The last whorl is barely free at the aperture. Peristome is simple, not expanded, but having a small lobe at the sutural extremity.

The operculum lodges lid-like upon the edge of the peristome. It is circular, concave within, flat externally, composed of about 7 narrow, closely-wound whorls, which are obliquely striate and parted by a rather deep, narrow suture.

Length 7, diam. 7 mm.

Locality.—Fifteen miles south of Media Luna, on the Pilón road, collected by O. Tollin. Type no. 111444 A. N. S. P., paratypes in coll. Ramsden.

A species of peculiar form. No other *Rhytidopoma* (= *Ctenopoma*, preoccupied) is of this shape. A slight approach to the sculpture of *R. tollini* is seen in *R. perspectivum.* In life the shells are thickly coated with soil.

MICROCERAMUS LONGUS, N. SP.

BY JOHN B. HENDERSON.

Among a lot of shells recently received from a limestone hill belonging to the Cubitas range in northern Camaguay Province, Cuba, is a new *Microceramus* belonging to the *gossei* group but quite distinct from that well-known and widely-distributed species. It is figured on plate vi, fig. 4. I give the following diagnosis:

Shell imperforate, turrited, tapering above the tenth whorl to an entire apex. Nuclear whorls two, ribbed. Opaque corneous brown streaked with wide white patches. Sculptured with oblique, closely pressed striæ, about 50 on lower whorls. Below and sometimes crossing the suture an irregularly spaced row of white nodules or bosses, less frequent in upper whorls. Whorls 15, well rounded in upper series becoming almost flat on cylindrical portion of shell. Base shows a very faint keel. Aperture slightly oblique, almost round, with white and very feebly expanded lip, the converging ends separated by smooth parietal wall. Axis simple.

Length 14, diam. 3.5 mm.; length ap. 2.75 mm.

Length 12, diam. 4 mm.

Length 10, diam. 3.25 mm.

In the lot received there is but little variation in color or disposition of white sutural nodules, but some range in size. The large number of whorls and the general facies of the shell at once suggests the *Spiroceramus* group, but the absence of an axial lamella precludes it.

Type no. 111447 A. N. S. Phila. ; topotypes in coll. J. B. H.

DESCRIPTION OF A NEW SPECIES OF VERTIGO, WITH NOTES ON OTHER FORMS.

BY GEO. H. CLAPP.

VERTIGO ALABAMENSIS n. sp. Plate vi, figs. 6, 6*a*, 6*b*.

The shell is cylindric-oval, perforate, convex, sutures well impressed, the last whorl somewhat tapering below, bulging above, and deeply constricted over the palatal folds ; crest well marked. Lip well reflected, pale brown, and deeply constricted opposite the upper palatal, simple above the constriction, and with a strong callous or internal collar running down and connecting with the columella. Denticles 7, the parietal high, sinuous and deeply entering ; angular strong, flat ; upper palatal deep, very high in front and tapering to the rear, lower palatal very deeply seated, inner end back of the subcolumellar lamella, both palatals distinctly showing from the outside as white lines. Columellar lamella strong flat ; subcolumellar bifid, strong ; basal fold distinct, set on the callous collar just below the subcolumellar lamella.

Length 1.8, diam. 1.0 mm.—Length of aperture 0.69, width 0.63 mm.

"Among rotting leaves in a ravine near junction of North River with Black Warrior, Tuscaloosa Co., Ala." (H. H. Smith 1909).

VERTIGO ALABAMENSIS CONECUHENSIS n. subsp. Plate, vi, figs. 7, 7*a*.

At Evergreen, Conecuh Co., Ala., Mr. Smith found a variety (No. 9158) which differs from the type in being shorter and more globose with the teeth less strongly developed and the basal fold absent in all shells examined. Length 1.53, diam. 1.0 mm. Length of aperture 0.58, width .63 mm.

The types of these are in my collection ; paratypes in coll. A. N. S. Phila.

VERTIGO OSCARIANA Sterki, variety. Plate vi, fig. 8.

This rare species was taken at Evergreen, Conecuh Co., Alabama. The specimens are more transparent than the types, and a little less strongly striate, but they agree in the characters of the aperture.

A NEW SPECIES OF MODIOLARIA FROM BERING SEA.

BY WILLIAM HEALY DALL.

Iredale has selected as type of *Musculus* Bolten, 1798, the species *Mytilus discors* Gmelin, the *Musculus* of Klein having no nomenclatorial standing. Therefore the familiar name *Modiolaria* becomes a synonym.

In a handful of dry algae sent from the Pribiloff Islands, Bering Sea, by Mr. G. Dallas Hanna, and profusely inhabited by the fry of *Mytilus edulis*, *Turtonia minuta* and young *Haloconcha reflexa*, a number of specimens which seemed unduly inflated for young *Mytilus* were noted. Placed under the microscope these were recognized as something new, though a casual glance would hardly have led to their separation.

Musculus phenax n. sp.

Shell small, very solid, inflated, brownish or bluish black, mytiliform; anterior end very short, but with the beaks extending slightly in front, attenuated, rounded, compressed below, with two or three radial impressed sulci; posterior end widening, rounded, the dorsal margin with an obscure angle about midway, the base behind the sulci convexly arcuate; the beaks blunt, inflated, conspicuous; surface polished, with inconspicuous incremental irregularities; interior blackish purple, with a very strong nymph for the ligament, and three or four denticles where the external sulci meet the margin. Length 7.7, maximum breadth 4.5, maximum diameter 4.0 mm.

Habitat. St. George Island, Pribiloff group, Bering Sea, living among algae, to which the specimens adhere by a strong byssus. U. S. Nat. Mus., no. 271733.

This would certainly be taken for a young *Mytilus* without careful examination. The most obvious differences are the greater inflation; the anterior portion (which is usually pale in the *Mytilus*) is dark; the inflated beaks which do not quite reach the anterior end, and internally the hinge characters. It agrees with *M. vernicosa* Midd. in not forming a byssal net over the valves.

OLIVA LITTERATA, LAMARCK.

BY WM. G. MAZYCK.

In the February Nautilus Mr. Johnson substitutes Conrad's name *Oliva carolinensis* for *O. circinata*, Marrat, which he had previously used for this well-known shell, Lamarck's name having been pre-occupied by Bolten, overlooking the fact that Dr. Edmund Ravenel had published the name *Oliva sayana* twenty-nine years before Conrad's description of *Dactylina carolinenis.*

The little shelf of books which I dignify with the title of "my Library" furnishes the following facts:

In 1834 Dr. Ravenel published a Catalogue of the Recent Shells in his Cabinet, on page 19 of which we find these entries:

"O. litterata, Lam. 20 Ceylon.

* O. Sayana, South Carolina.

* O. litterata, Say.

* These shells are certainly distinct, and therefore should be distinguished by different names. The O. Sayana, sometimes exceeds 3 inches in length—fine specimens are rare—worn specimens not uncommon on the coast of South Carolina."

In 1874 a second edition of this Catalogue was issued and on page 16 we read:

"512 O. litterata, (O. Sayana, Rav.) Sull. I., S. C."—a clear indication that he recognized the specific identity of the shells which he had formerly considered distinct.

I find no further allusion to Ravenel's name until 1889 when Dr. Dall mentions it as a synonym of *O. litterata* Lam., in Blake Moll., part 2, p. 133. With these facts before us it appears that the correct synonymy is

OLIVA SAYANA, Ravenel.

Oliva litterata, Lamarck, Ann. Mus., xvi, p. 315, 1810.

Oliva literata, Say, Am. Conch., pl. 3, 1830.

Oliva sayana, Ravenel, Cat., p. 19, 1834.

Oliva cylindrica, Sowerby Quar. Jour. Geol., vi, p. 45, 1849, pars.[1]

[1] Fide Johnson.

Strephona literata, Tuomey & Holmes, Pleioc. Foss. S. C., p. 140, 1857.

Olivancillaria (*Utriculina*) *litterata*, H. & A. Adams, Gen. i, p. 141, 1858.

Dactylina carolinensis, Conrad, Pro. Ac. Nat. Sci., p. 563, 1862.

Oliva circinata, Marrat, Thes. Conch., iv. p. 21, 1871.[1]

Oliva litterata, (*O. Sayana*, Rav.) Ravenel, Cat., p. 16, 1874.

PLEUROBEMA MISSOURIENSIS MARSH.

BY BRYANT WALKER.

This species was described by the late William A. Marsh in 1901 in THE NAUTILUS, xv, p. 74. The types were collected by the late Ellwood Pleas in the Black River near Poplar Bluff, Butler Co., Mo. It has not as yet been found by any other collector. It was not figured by the author, and owing to this fact and the rather unfortunate comparisons with other species made in the remarks accompanying the description, it has always been a conundrum to other students of the Unionidæ.

After Mr. Marsh's death in 1913, his collection of Unionidæ was acquired by Mr. L. S. Frierson and myself. The four specimens of *missouriensis* mentioned by Marsh were found and the type and one other are now in my collection. The other two belong to Mr. Frierson.

The specimen now figured (pl. V, figs. 1, 2) is marked "Type" on the interior of the right valve.

The examination of these specimens shows that the systematic position and relationship of the species was misunderstood by Mr. Marsh.

Missouriensis is not a *Pleurobema*, but is a *Quadrula* of the *subrotunda* group as defined by Simpson. It has no resemblance to *P. bigbyense* Lea at all. The comparison with *P. hartmanianum* Lea is equally fallacious and would seem to have been based upon a misapprehension of that species, for which, perhaps, he is not to blame. *Hartmanianum* is restricted to the

[1] Fide Johnson.

Alabama drainage system, but Simpson states that Lea, himself, had identified certain shells from the Clinch River as that species. This may have been the source of the erroneous comparison. At any rate, in the collection of the late Mrs. George Andrews were shells from the Holston River, which had been identified by Marsh as *hartmanianum*, and it seems probable that it was with such shells that the comparison was made. These shells are identical with the form that he subsequently described as *Q. beauchampii*. Both this species and his *Q. andrewsii* are hardly distinguishable from *globata* Lea and *pilaris* Lea and, indeed, all of these forms, together with *lesueurianus* Lea, form a natural group of inosculating races, which may represent simply a phase of *subrotundum* Lea. In the French Broad, Tellico and Hiawassee rivers there is found a form that is more compressed than typical *pilaris* and which would seem to be nearer to *lesueurianus*. It is with this form that *missouriensis* is most closely allied and, until a final and authoritative disposition can be made of the entire group, it must be considered as the western representative of that very perplexing aggregation.

STUDIES IN NAJADES.

BY A. E. ORTMANN.

(*Continued from page 131.*)

CARUNCULINA TEXASENSIS (Lea) (See Ortmann, 1912, p. 339).

I have specimens from the Old River of the Ouachita River, Arkadelphia, Clark Co., Ark., among them gravid females, collected by H. E. Wheeler on July 17, 1911, which had in part eggs, in part young glochidia, and females with eggs collected August 20, 1912. L. S. Frierson sent gravid females with eggs and ripe glochidia, collected August 1, 1912, in Sabine River, Logansport, De Soto Par., La. Thus also here the breeding season remains obscure, but conditions might be the same as in *C. parva*. A specimen from Logansport, collected Aug. 1, was discharging.

Soft parts very much like those of *C. parva*, but the black spot behind the caruncle is not well marked, but represented by a black streak, extending along the branchial opening forward to the base of the caruncle, and beyond. Caruncle globular, subcylindrical, or pear-shaped, brownish or white, and quite conspicuous upon a black base. In the male, the black streak may be distinct or obscure, and the caruncle is entirely missing.

Rest of the anatomy as described previously; in one specimen, however, the inner lamina of the inner gills was free for only about one half of the length of the abdominal sac. In all specimens, the supraanal was open.

Glochidia identical with those of *C. parva*, Length: 0.18. Height: 0.20 mm.

Carunculina glans (Lea) (see: *Lampsilis* (*Carunculina*) *glans* Simpson, 1900, p. 565).

A sterile female from the Old River of Ouachita River, Arkadelphia, Clark Co., Ark., collected by H. E. Wheeler, July 17, 1911.

Inner edge of mantle, from branchial to caruncle, and a little in front of the latter, with a black streak, this streak, most intense just behind the caruncle, forming an ill-defined black blotch. Caruncle subcylindrical, brown.

Edge of sterile marsupium dark brown (no dark pigment seen here in *C. parva* and *texasensis*).

Medionidus conradicus (Lea). (See Ortmann, 1912, p. 335.)

Only one male and a gravid female were at hand when I described the anatomy of this form. Recently I have collected a large number in North Fork, Holston River, Saltville, Smyth Co., Va. (September 17, 1912), and in Clinch River, Richland and Raven, Tazewell Co., Va. (September 20 and 21, 1912), and preserved the soft parts of six males, two sterile, and six gravid females. All of the latter have glochidia, but in some they are immature, thus indicating the beginning of the breeding season early in September.

Soft parts as described, and inner lamina of inner gills always free, except at anterior end. Marsupium as described, but

larger in larger specimens. Ovisacs as distinct as in other forms; their number may go up to 20 and even more. The marsupium assumes, when larger, the normal, kidney-like shape, but there is always a considerable part of the gill, at the posterior end, non-marsupial.

Inner edge of mantle, in front of the branchial, with very variable papillae. My former description apparently represents not the normal condition, for in the present material the papillae are posteriorly (near the branchial) generally very indistinct, often absent, and only anteriorly there are one, two or three rather long ones, of subcylindrical shape (but hardly "hair-like").

Glochidia as described before, almost subspatulate (with anterior and posterior margins nearly straight and forming an indistinct angle with the lower margin). They are much higher than long. Length 0.28, height 0.27 mm. (former measurements 0.22 x 0.28).

I have seen in none of the specimens from the Holston and Clinch Rivers a trace of the byssus of the adult shell.

Color of soft parts: whole mantle, and also the gills and posterior part of abdominal sac, suffused with black. Mantle margin intensely black posteriorly. The charged marsupium is white, without pigment on the edge, and contrasts strongly with blackish color of the rest of the gills.

I think *Medionidus* is a good genus, distinguished by character of shell and soft parts. The location of the marsupium, and of the marsupial swelling of the female shell is different from that of the allied genera (chiefly *Eurynia*), but also shell sculpture and papillae of mantle offer good characters.

(*To be concluded.*)

NOTES.

Gonidea angulata Lea. In a letter from Mr. John A. Allen who has been collecting shells in Oregon, especially about his home in Oswego, he states, that *Gonidea angulata* Lea was in great abundance in the canal which connects Tualatin River with Oswego Lake, Clackamas Co., Oregon. Only a few young ones were seen. The *Gonidea* were well sunk in the gravel,

probably were obliged to be, to escape being washed out by the winter floods. Perhaps the juvenile specimens were sunk so as to be practically invisible. Where the canal passed through hard clay, the *Gonidea live in holes* something like *Petricola ploladiformis* Lam. "*I wonder how they made the holes?*" The canal is not for boats, but carries water for power. At most places it is a trough blasted through rock, and here the *Gonidea* are very abundant in the running water ; but it also lives in the still water of the lake.—E. G. Vanatta.

A Repaired Shell.—While digging *Zirfœa gabbi* Tryon, at Anaheim Bay, Cal. recently I took one about 2½ inches long that had repaired a very bad break in its shell. One valve was whole but the other had been broken from end to end, the break being nearly straight and not far from the umbones and a piece of the shell as large as a 25-cent piece was entirely gone from the lower end of the valve. At the line of the break the pieces of shell had separated ¼ inch and were fastened together by new shell nearly to the original outline. The new shell was somewhat translucent and lacked the characteristic sculpturing of the shell. In the same bank of red clay I get *Pholas pacifica* Stearns, *Platyodon cancellatus* Conrad, and *Schizothœrus nuttallii* Conrad.—E. P. Chace.

On the occasion of the dedication of the Mellon Institute of Industrial Research of the University of Pittsburg, February 26th, the honorary degree of Doctor of Science was conferred upon Mr. George Hubbard Clapp, president of the board of trustees of the University.

Dr. Paul Bartsch has been made Curator of Marine Invertebrates of the National Museum. As conchologists we hope that his new responsibilities will not diminish his activities along molluscan lines.

PUBLICATIONS RECEIVED.

Illustrations of a Thousand Shells, part 2, By Y. Hirase, Kyoto, Japan, Jan. 1915. The second part of this unique work, is fully as interesting as the first. It contains 105 excellent figures making the total for the two parts 200. The author shows indomitable zeal in promoting the study of Japanese mollusks. He deserves all the encouragement possible, and we wish him success.—C. W. J.

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